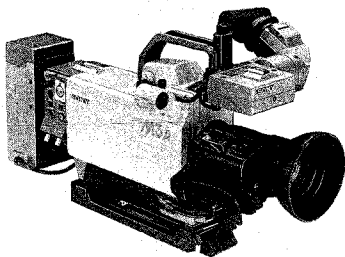


MF "SATICON" COLOR VIDEO CAMERA  
ELECTRONIC VIEWFINDER  
BATTERY ADAPTOR  
TRIPOD ADAPTOR

**DXC-M3A**  
**DXF-M3A**  
**DC-8**  
**VCT-M3**  
**VCL-915BY**



**SONY**  
**SERVICE MANUAL**

### **SAFETY RELATED COMPONENT WARNING**

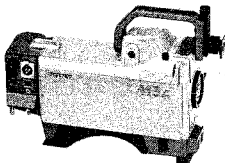
Components identified by shading and  $\Delta$  marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

### **X-RAY RADIATION WARNING**

Be sure that parts replacement in the high voltage block and adjustments made to the high voltage circuits are carried out precisely in accordance with the procedures given in this manual.

# DXC-M3A

## COLOR VIDEO CAMERA HEAD



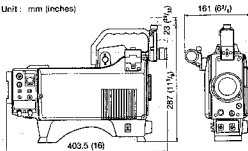
### SPECIFICATION

#### Camera (DXC-M3A)

Pickup tube	2 1/2-inch Saticon (magnetic focus, static deflection)
System	RGB 3-tube system
Spectral system	F1.4 medium index prism system
Built-in filters	0: Blind 1: 3200°K 2: 5600°K + 1/4 ND 3: 5600°K
Lens mount	Bayonet mount
Signal system	EIA standards, NTSC color system
Scanning system	525 lines 2:1 interlace 30 frames/sec. Internal (FS-170A)
Sync system	External with the VBS or BS signal supplied to the GEN LOCK input connector or the camera cable connector (through the GEN LOCK connector of the CCU-M3)
Horizontal frequency	15,734.26 kHz
Vertical frequency	59.94 Hz
Horizontal resolution	850 lines (center)
Minimum illumination	40 lux (4 footcandles) with F1.6, +18 dB
Sensitivity	2,000 lux (200 footcandles) with F4, at 3200°K
Gain selection	0 dB, 9 dB or 18 dB, selectable
Video output	1.0 V(p-p), sync negative, 75 ohms, unbalanced
Signal-to-noise ratio	57 dB
Outputs	Camera cable connector*: Sony Q-type, 14-pin VIDEO OUT: BNC-type EARPHONE: mini INTERCOM: mini intercom *Video output, color framing pulse output, microphone output, power input, recording and playback picture, etc.
Microphone input	MIC IN: Cannon XLR
Registration	0.1 % for Zone I 0.2 % for Zone II 0.5 % for Zone III
Geometrical distortion	Less than 1.5 %

#### General

Power requirements	12 V dc (10.5 to 17 V dc)
Power consumption	16 W (for camera only)
Operating temperature	-10°C to +45°C (14°F to 113°F)
Storage temperature	-20°C to +50°C (-4°F to +122°F)
Weight	Approx. 4.2 kg (9 lb 4 oz)
Dimensions	
Unit: mm (inches)	



#### Zoom lens (VCL-915BY)

Focal length	9.5 mm to 143 mm
Zoom	Manual and motorized, selectable
Zooming ratio	15 x
Maximum aperture ratio	1.8
Iris control	Manual and auto, selectable
Range of object field (at the distance of 1 meter)	1.8 to 16 and C (closed)
W (wide angle):	847 x 862 mm (25 1/2 x 34 inches)
T (telephoto):	43 x 57 mm (1 1/4 x 2 1/4 inches)
Minimum object distance	1 meter
Filter thread	86 mm dia.
Mount	Bayonet mount
Weight	Approx. 1.6 kg (3 lb 9 oz) with hood
Dimensions	Approx. 120 mm dia. x 189 mm (4 3/4 x 7 1/2 inches)

# SONY®

## SERVICE MANUAL

# TABLE OF CONTENTS

## 1. GENERAL DESCRIPTION

1-1. Composition .....	1-1
1-2. Features .....	1-2
1-3. Precautions .....	1-3
1-4. Location and Function of Controls .....	1-4
1-5. Power Sources .....	1-16
1-6. Connections .....	1-19
1-7. Adjustments .....	1-22
1-8. Operation .....	1-27

## 2. INSTALLATION

2-1. Board Layout .....	2-1
2-2. Accessories Supplied .....	2-2
2-3. Connectors and Cables .....	2-3
2-3-1. Connector Input/Output Signals .....	2-3
2-3-2. Connections .....	2-6
2-3-3. Removal of the CCQ Connector .....	2-7
2-4. Simple Adjustment .....	2-9
2-5. System Block Diagram .....	2-12
2-6. Self-Check Function For Auto-Control System ..	2-15
2-6-1. Indications and Meanings of the Term NG in the Auto-Centering Operation .....	2-15
2-6-2. Indications and Meanings of the Term NG in the Auto-White Balance Operation .....	2-16
2-6-3. Indications and Meanings of the Term NG in the Auto-Black Balance Operation .....	2-17

## 3. REPLACEMENT OF MAIN PARTS

3-1. Disassembly .....	3-1
3-1-1. Disassembly of Side Panels, Shoulder Pad .....	3-1
3-1-2. Removal of AT-31 Board .....	3-2
3-1-3. Removal of DF-20 Board .....	3-2
3-1-4. Removal of PS-26 Board .....	3-3
3-1-5. Disassembly of IF Box .....	3-3
3-2. Replacement of Main Parts .....	3-4
3-2-1. Replacement of Bias Light .....	3-4
3-2-2. Replacement of AUTO W/B BAL and AUTO CENT Switch .....	3-4
3-2-3. Replacement of Optical Prism Block .....	3-5
3-2-4. Replacement of Pick-up tube .....	3-7
3-3. Replacement of Electronic Viewfinder CRT .....	3-10
3-4. Chip Components .....	3-12
3-4-1. Chip components .....	3-12
3-4-2. Replacement of Chip Components .....	3-13

## 4. ALIGNMENT

4-1. Preparation .....	4-1
4-1-1. Connection for Adjustment .....	4-1
4-1-2. Switch Position Before Adjustment .....	4-2
4-1-3. Adjustment Procedures .....	4-3
4-1-4. Adjustment Fixtures and Equipment .....	4-3
4-1-5. Removal of the Shading Compensation Glass in Pattern Box .....	4-5
4-2. Power Supply System (PS-15 Board) .....	4-6
4-2-1. +9.5V Regulator Adjustment .....	4-6
4-2-2. +9V Regulator Adjustment .....	4-6
4-2-3. +5V Regulator Adjustment .....	4-6
4-2-4. Battery Alarm Adjustment .....	4-6
4-3. SYNC Generator System (SG-1A Board) .....	4-7
4-3-1. Sub-carrier Frequency Adjustment .....	4-7
4-3-2. V BLKG width Adjustment .....	4-7
4-3-3. INT SC Phase Adjustment .....	4-7
4-4. Encoder System (PR-61, EN28A Board) .....	4-8
4-4-1. Bars Level Adjustment .....	4-8
4-4-2. Y SYNC Level Adjustment .....	4-8
4-4-3. Carrier Balance Adjustment .....	4-8
4-4-4. BURST Phase and width Adjustment .....	4-9
4-4-5. H BLKG Pulse width Adjustment .....	4-9
4-4-6. Color Vector Adjustment .....	4-10
4-4-7. 1/2H Pulse width Adjustment .....	4-10
4-4-8. Color Bar Size Adjustment .....	4-11
4-4-9. I and Q Signal Phase Adjustment .....	4-11
4-4-10. Color Bar White Level Adjustment .....	4-11
4-5. Registration System .....	4-12
4-5-1. H Deflection Balance Adjustment .....	4-13
4-5-2. V Deflection Balance Adjustment .....	4-13
4-5-3. G · Beam, ABO Adjustment .....	4-14
4-5-4. R · Beam, ABO Adjustment .....	4-16
4-5-5. B · Beam, ABO Adjustment .....	4-18
4-5-6. GREEN E · Focus Adjustment .....	4-20
4-5-7. RED E · Focus Adjustment .....	4-20
4-5-8. BLUE E · Focus Adjustment .....	4-21
4-5-9. GREEN Back Focus Adjustment .....	4-22
4-5-10. GREEN Rotation Adjustment .....	4-23
4-5-11. RED Back Focus and Rotation Adjustment .....	4-24
4-5-12. BLUE Back Focus and Rotation Adjustment .....	4-25
4-5-13. Picture Frame Positioning Adjustment For Green Channel .....	4-26
4-5-14. Registration Adjustment .....	4-28
4-5-15. RED Registration Adjustment .....	4-29
4-5-16. BLUE Registration Adjustment .....	4-32



4-6. Process System .....	
4-6-1. Bias Light Adjustment .....	4-35
4-6-2. GREEN Offset Adjustment .....	4-35
4-6-3. GREEN PA Frequency Response Adjustment .....	4-36
4-6-4. RED PA Frequency Response Adjustment .....	4-37
4-6-5. BLUE PA Frequency Response Adjustment .....	4-38
4-6-6. GREEN APC and AGC Adjustment .....	4-39
4-6-7. G-ch Video Level Adjustment .....	4-40
4-6-8. R-ch Video Level and Pre-Sub-gain Adjustment .....	4-41
4-6-9. B-ch Video Level and Pre-Sub-gain Adjustment .....	4-42
4-6-10. Black Shading Adjustment .....	4-43
4-6-11. Black Set Adjustment .....	4-44
4-6-12. Green Pedestal Adjustment .....	4-44
4-6-13. Green Gamma Balance and Gamma Set Adjustment .....	4-45
4-6-14. Red and Blue Pedestal Adjustment .....	4-45
4-6-15. Red and Blue Gamma Balance, Gamma Set and Sub-gain Adjustment .....	4-46
4-6-16. White Clip Adjustment .....	4-47
4-6-17. IE (Crispening, H/V Ratio and DTL Level) Adjustment .....	4-48
4-7. Automatic Control System .....	4-49
4-7-1. Automatic Iris Control Adjustment .....	4-49
4-7-2. Low Light Adjustment .....	4-49
4-7-3. ABL Adjustment .....	4-50
4-7-4. Character Size Adjustment .....	4-50
4-8. Intercom System .....	4-52
4-8-1. SIZE TONE Adjustment .....	4-52

## 5. DIAGRAM

5-1. Block Diagram .....	5-1
Overall System .....	5-1
PA-22 Board, PS-26 Board, PR-61 Board .....	5-4
EN-28A Board .....	5-7
IE-7 Board .....	5-9
DF-20 Board .....	5-11
AT-31 Board .....	5-13
PS-15 Board .....	5-15
SG-1A Board .....	5-17
IF-70 Board .....	5-19
5-2. Mounted Circuit Board and Schematic Diagram .....	5-21
PA-22 Board (Pre Amp), PS-26 Board (Focus Regulator) .....	5-21
PR-61 Board (Process) .....	5-25
IF-70 Board (Image Enhancer) .....	5-32
EN-28A Board (Encoder) .....	5-38
PS-15 Board (Power Supply, ABO) .....	5-46
DF-20 Board (Deflection) .....	5-53
AT-31 Board (AUTO B/W & AUTO CENT/ GAIN Control) .....	5-58
SG-1A Board .....	5-66
Main Frame, CN-97 Board, SW-99 Board, SW-70 Board .....	5-71
Interface Frame, IF-70 Board, AA-5 Board, SW-58 Board, SW-78 Board .....	5-81

## 6. SPARE PARTS

6-1. Parts Information .....	6-1
6-2. Exploded View .....	6-2
6-3. Electrical Parts List .....	6-7





## 1-2. FEATURES

### High quality picture

#### High quality picture

● The Magnetic-focus Static-deflection tubes developed by Sony have the following features and assure a high quality picture.

— High resolution can be obtained at any position on the screen.

— The deflection distortion is low, and very precise registration is possible.

— The camera uses Saticon film which is less subject to comet tails.

— The signal is output from the tubes through the connector pins and the first-stage FET is built into the coil for a high signal-to-noise ratio.

● Built-in two-line image enhancer increases picture sharpness.

#### High sensitivity

The video output level can be raised by either 9 dB or 18 dB. Even at the 18 dB position, a high quality picture is assured.

#### Built-in, highly stable sync signal generator

The highly stable sync signal generator built into the camera generates a sync signal which has the following features:

● The phase between horizontal sync and subcarrier has been adjusted precisely so that the color framing complies with RS-170A specifications.

● Vertical and horizontal blanking intervals are adjustable.

### Automatic adjustment functions

#### Automatic white balance and black balance adjustments and preset white balance

The white balance and black balance are automatically adjusted by a microcomputer, and the adjusted values are stored in the digital memory even when the power is off. The black level drift of each pickup tube with respect to the reference black level is automatically adjusted, together with the black balance.

When the BARS/WB selector is set to 3200°K, a white balance at 3200°K is obtained. This allows you to start recording without the delay caused by the need to adjust the white balance.

#### Automatic centering adjustment

Due to a newly developed automatic centering adjustment system controlled by a microcomputer, the pickup tubes can be centered easily.

The adjusted value is stored in the digital memory even when the power is off.

#### Automatic beam optimizer

An automatic beam optimizer allows the camera to accept light input of up to 8 times that of normal levels without comet tails or blooming.

#### Automatic black level (ABL) adjustment

If the entire picture is too bright, such as during outdoor shooting, the black level is reduced to the appropriate level so that a well-contrasted picture can be obtained.

### Display and related functions

#### Character display

The character generator built into the camera permits characters and numbers to be displayed on the viewfinder and monitor so that a title can be inserted in a recording. The title characters which have been set are stored in the memory even when the power is off. The operational state of the camera can also be monitored with the character display warning indication on the viewfinder.

#### Master pedestal control and iris override function

The master pedestal level and the reference level for automatic iris adjustment can be adjusted manually while they are displayed on the viewfinder.

### System use

#### Versatile connection capability

Various types of VTRs, such as a VTR equipped with a Q-type 14-pin camera connector or a VTR with a K-type 14-pin camera connector, can be connected to this camera.

#### Use as a studio camera

The camera can be used as a studio camera when a CCU-M3 camera control unit is connected. The CCU-M3 can remotely control most of the functions of the camera.

#### Color framing pulse output

The color framing pulse is output from the camera so that the phase of the color framing pulse of a VTR connected to the camera can be synchronized with the camera.

#### Warning system for the VTR

If there is a problem with the VTR or the tape or if the battery of the VTR is weak, warning indicators in the viewfinder light up. An audible alarm will sound simultaneously through the earphone.

### Other features

● Split color bar generator.

● Gen-lock to VBS input.

● Zebra pattern allows more accurate manual iris adjustment.

● The auto-close mechanism for the lens protects the pickup tubes when they are not in use.

● Viewfinder adjustable both vertically and horizontally.

● Four way power supply.

● Low power consumption.

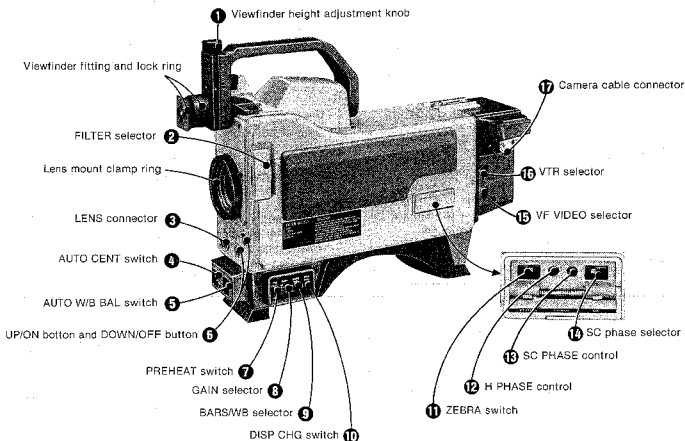
● Color temperature conversion filters for optimum color balance indoors and outdoors.



## 1-4. LOCATION AND FUNCTION OF CONTROLS

Each number in the photo is keyed to the descriptive text.

### DXC-M3A COLOR VIDEO CAMERA



#### 1 Viewfinder height adjustment knob

Turn this knob to adjust the height of the viewfinder.

#### 2 FILTER selector

Select the appropriate filter as indicated below.

Filter number	Color temperature	Lighting conditions
0	Blind	When the camera is not in use, or while the lens is being changed.
1	3200°K	Iodine lamp, sunrise or sunset
2	5600°K + 1/4 ND*	Bright outdoor
3	5600°K	Cloudy or rainy

\* ND: Neutral density filter

#### 3 LENS connector (6-pin)

Connect the lens connector plug of the lens here.

#### 4 AUTO CENT (automatic centering) adjustment switch

**START:** For automatic centering adjustment, point the camera at an appropriate object and set this switch to START. The switch automatically returns to the center position (MEMORY) when it is released.

**MEMORY:** When the switch is set to this position, the automatically adjusted centering value obtained by setting the switch to START is memorized.

**PRESET:** The centering value preset at the factory will be obtained.

#### 5 AUTO W/B BAL (automatic white/black balance) adjustment switch

When the BARS/WB selector 9 is set to AUTO, white balance and black balance can be automatically adjusted with this switch. Black balance can also be adjusted automatically with this switch when the BARS/WB selector is set to 3200°K.

**WHT:** For automatic white balance adjustment, set this switch to WHT. The adjusted value will be automatically memorized.

**BLK:** For automatic black balance and black set level adjustment, set this switch to BLK. The adjusted value will be automatically memorized.

This switch automatically returns to the center position when it is released after being set to WHT or BLK.

#### ① UP/ON button and DOWN/OFF button

These buttons are used with the DISP CHG switch (1) to set and position the title characters, (2) to switch on or off the "LOW LIGHT" indication, (3) to raise or lower the reference level of the automatic iris adjustment, or (4) to raise or lower the master pedestal level. For details, refer to "WARNING INDICATORS AND CHARACTER DISPLAY" on page 1-30.

#### ② PREHEAT switch

Set to ON to turn the camera on after setting the POWER switch to ON. When this switch is set to PREHEAT, power is supplied only to the pickup tubes and the viewfinder in order to conserve power. At the PREHEAT position, the iris of the zoom lens is automatically closed to protect the pickup tubes.

#### ③ GAIN selector

Normally set this selector to "0". When the selector is set to "9" or "18", the video output level is raised by 9 dB or 18 dB respectively.

#### ④ BARS/WB (color bar generation/white balance adjustment) selector

**BARS:** When the selector is set to this position, a color bar signal is generated and supplied to the viewfinder and output from the VIDEO OUT connector and the camera cable connector. Use this position for adjusting the video monitor. At this position, the iris of the zoom lens attached to the camera will be automatically closed.

**AUTO:** Generally set the selector to this position. When the AUTO W/B BAL switch ⑤ is set to WHT or BLK, the white balance or black balance will be automatically adjusted (and memorized). After the adjustment, the memorized white balance and black balance values are always obtained at this position. When the CCU-M3 camera control unit is connected to this camera, set the selector to this position.

**3200°K:** At this position the white balance is set to the factory preset value of an iodine lamp (3200°K). When the selector is set to this position, set the FILTER selector ⑥ to an appropriate position. Use this position when you have no time to adjust the white balance. When the BARS/WB selector is set to this position, the automatic white balance adjustment of the AUTO W/B BAL switch ⑤ will not operate. (However, the automatic black balance adjustment of the AUTO W/B BAL switch operates.)

#### ⑤ DISP CHG (display change) switch

Each time this switch is pressed, the character display on the viewfinder screen changes in the following order: (1) alarm indication, (2) "LOW LIGHT" indication on/off, black balance, white balance, centering and gain settings, (3) initial indication of title setting and display of set title characters, (4) reference level setting for automatic iris adjustment, and (5) master pedestal level setting. To set title characters, automatic iris reference level and master pedestal level, or to switch on/off the "LOW LIGHT" indication, use the UP/ON and DOWN/OFF buttons. For details, refer to "WARNING INDICATORS AND CHARACTER DISPLAY" on page 1-30.

#### Note

In character display modes (3) to (5), the automatic white balance, black balance and centering adjustment systems do not function.

#### ⑥ ZEBRA switch

This switch is used for manual iris adjustment. When the switch is set to ON, a zebra pattern appears as a reference for iris adjustment on the part of the viewfinder screen where the video level of the object is 70% to 80% in IRE unit. If the zebra pattern is not necessary, set this switch to OFF.

#### ⑦ H (horizontal) PHASE control

When two or more cameras are used, turn this control with a small screwdriver to adjust the H phase difference between the gen-lock input and video output signals.

#### Note

It is not necessary to use this control when only one camera is used.

When the camera control unit is connected, adjust the H phase difference with the H PHASE control of the camera control unit.

#### ⑧ SC (subcarrier) PHASE control

When two or more cameras are used, this control is used for fine adjustment of the SC phase after the rough adjustment performed by the SC phase selector ⑨.

#### ⑨ SC (subcarrier) phase selector

When two or more cameras are used simultaneously, select the SC phase difference between the gen-lock input and video output signals so that it is roughly adjusted to 0° or 180°.

#### ⑩ VF (viewfinder) VIDEO selector

Selects the pictures shown on the viewfinder screen.

**CAMERA:** Camera pictures are shown during both recording and playback. When the character display function is to be used, be sure to set the selector at this position.

**AUTO:** Camera and VTR pictures are automatically selected; camera pictures are shown during recording and VTR pictures are shown during playback. Note, however, that pictures may not be automatically switched when the camera is used with certain VTRs. For details, refer to the table shown on page 1-21.

When a CCU-M3 camera control unit is connected to the camera, set the selector at this position so that the return video pictures are shown on the viewfinder screen while the VTR START/RETURN VIDEO button is kept depressed and camera pictures are shown when the VTR START/RETURN VIDEO button is released.

**VTR:** VTR pictures are shown during both recording and playback. Note that with certain VTRs, video signals are not supplied to the camera during recording; therefore, no pictures are shown on the viewfinder.

#### ⑪ VTR selector

Selects the VTR start/stop signal modes in accordance with the type of VTR used. For details, refer to the table on page 1-21.

- 1: For U-matic and Betamax VTRs used for office and educational purposes, and for U-matic and 1-inch VTRs used for broadcast purposes. When a CCU-M3 camera control unit is connected to this camera, be sure to set the selector to this position.
- 2: For Betamax VTRs used for home-entertainment.
- 3: For other types of VTRs.

#### Caution

Be sure to set the VTR selector to the correct position for the VTR used. If it is not, the VTR might not operate properly.

#### ⑫ Camera cable connector (Sony Q-type, 14-pin)

This is the camera's main input/output connector. Connect a VTR, a CCU-M3 camera control unit, or a CMA-8 or CMA-7 camera adaptor to this connector using the CCQ camera cable.

The set title characters, displayed on the viewfinder screen, are output from this connector.

#### ⑬ Accessory shoe

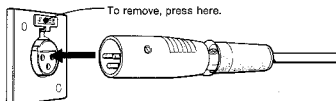
An optional DXF-40 or DXF-50 viewfinder can be attached here.

#### ⑭ MIC IN (microphone input) connector (XLR 3-pin, unbalanced)

Connect a microphone here.

##### Pin configuration

1: Ground 2: Cold 3: Hot



#### Note

The pins No. 1 (ground) and No.2 (cold) are connected inside the camera (unbalanced microphone input). Make sure that the pin configuration of your microphone is the same as above. If the microphone has a different pin configuration, you must use an adaptor.

#### ⑮ POWER switch

Set to ON to turn the camera on.

#### ⑯ Battery adaptor shoe

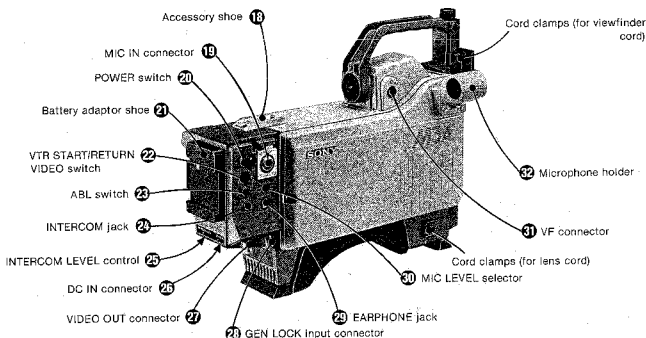
Attach the DC-8 battery adaptor here.

#### ⑰ VTR START/RETURN VIDEO button

When the camera is connected to a portable VTR, press this button to start recording. To stop recording, press the button again.

If the camera is connected to a CCU-M3 camera control unit and the VF VIDEO selector is set to AUTO, the return video pictures can be monitored on the viewfinder screen while the button is kept depressed. When the button is released, the camera pictures can be monitored. When the VF VIDEO selector is set to VTR, the return video pictures are always shown on the viewfinder irrespective of the operation of this button. This is convenient for wipe or external key operation with a special-effects generator.





#### 23 ABL (automatic black level) switch

When the entire picture is too bright, such as during outdoor shooting, set this switch to ON. The black level will be reduced to the appropriate level and well-contrasted pictures will be obtained. Normally set the switch to OFF.

#### 24 INTERCOM jack (mini intercom jack)

Connect a DR-100 Intercom headset (optional) here. It will be possible to communicate between the camera and the connected camera control unit or a special-effects generator. The volume of the headset can be adjusted with the INTERCOM LEVEL control 25.

#### 25 INTERCOM LEVEL control

When a headset is connected to the INTERCOM jack 24, turn this control with a small screwdriver to adjust the volume of the headset.

#### 26 DC IN (input) connector (XLR 4-pin)

Connect the plug of the DC-8 battery adaptor to supply power from the batteries.

#### Note

When the battery adaptor is connected to this connector, the camera cannot be operated with other power sources.

#### 27 VIDEO OUT (output) connector (BNC connector)

Connect to the video input of the VTR or video monitor. Title characters displayed on the viewfinder screen are output from this connector.

#### 28 GEN LOCK input connector (BNC connector)

When using more than two cameras simultaneously without using a CCU-M3 camera control unit, connect the gen-lock input signal (VBS or BS) for synchronization here. No connection is necessary when only one camera is used.

#### Note

When the gen-lock input signal is connected to the camera, the color framing pulse output from the camera cable connector is automatically cut off.

#### 29 EARPHONE jack (mini jack)

Connect an earphone to monitor the playback or recording sound from the VTR.

#### 30 MIC LEVEL selector

Selects the output level of audio signals, picked up by the microphone and output from the camera to a VTR in accordance with the type of VTR used: -60 dB or -20 dB. When a CCU-M3 camera control unit is connected to the camera, set this selector to -60 dB. For details, refer to the table on page 1-21.

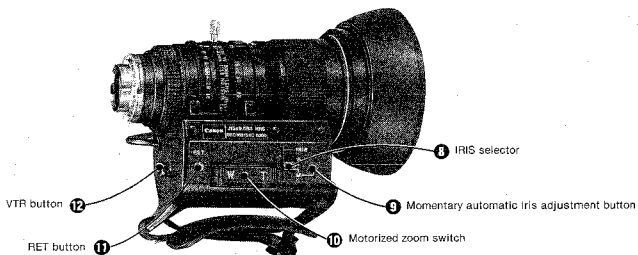
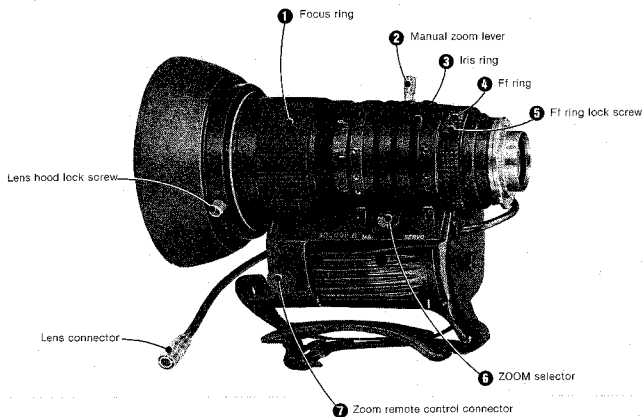
#### 31 VF (viewfinder) connector (8-pin)

Connect the plug of the viewfinder.

#### 32 Microphone holder

Use this microphone holder to clamp an optional C-74 microphone.

# VCL-915BY ZOOM LENS



**① Focus ring**

Turn this ring for focusing.

**② Manual zoom lever**

For manual zooming, turn this lever with the ZOOM selector set to MANU.

**③ Iris ring**

For manual iris adjustment, turn this ring with the IRIS selector set to M.

**④ Ff (flange focal length) adjustment ring**

Turn to adjust the flange focal length. See page 1-23.

**⑤ Ff (flange focal length) adjustment ring lock screw**

Locks the Ff ring at the adjusted position.

**⑥ ZOOM selector**

**SERVO:** For motorized zooming.

**MANU:** For manual zooming.

**⑦ Zoom remote control connector (8-pin)**

Connect an LO-26 lens remote control unit (optional) for remote control of zooming when the camera is attached to the tripod.

**⑧ IRIS adjustment selector**

**A:** For automatic iris adjustment.

**M:** For manual iris adjustment.

**⑨ Momentary automatic iris adjustment button**

The iris is automatically adjusted while this button is kept depressed, when the IRIS selector is set to M. When the button is released, the iris will be fixed at the value that has just been obtained until the iris is adjusted again manually.

**⑩ Motorized zoom switch**

Press either end of this switch for motorized zooming with the ZOOM selector set to SERVO: W for a wide-angle picture and T for a telephoto picture. Zooming is fast when the switch is pressed down all the way and slower when the switch is pressed down only slightly.

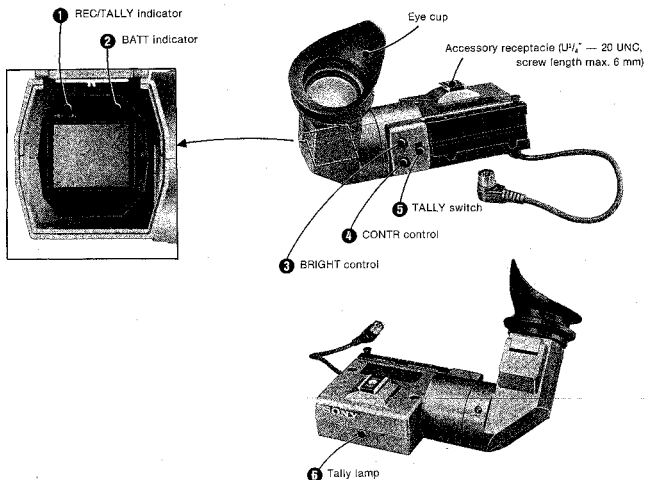
**⑪ RET (return video) button**

Press to view the picture from the VTR during recording, the playback picture during playback, or the signal from the CCU-M3 camera control unit on the viewfinder screen. This button has the same function as the VTR START/RETURN VIDEO button of the camera (return video switch) when a CCU-M3 is connected.

**⑫ VTR button**

When a portable VTR is connected to the camera, press this button to start and stop recording. This button has the same function as the VTR START/RETURN VIDEO button of the camera (start switch).

## DXF-M3A VIEWFINDER



### 1 REC/TALLY indicator

Illuminates during recording with one camera, and illuminates when the camera's picture is selected by a control console, a special-effects generator, etc., connected to the CCU-M3 camera control unit which is connected to the camera. The indicator blinks in accordance with the warning system of the VTR.

### 2 BATT (battery) indicator

Starts blinking several minutes before the battery of the VTR or the CCU-M3 is discharged to a level at which it cannot power the VTR or the CCU (about 11 V), and illuminates steadily when the battery has discharged to that level. (For details, refer to the table on page 1-21.)

### 3 BRIGHT (brightness) control

Adjusts the brightness of the picture on the viewfinder screen. To obtain a brighter picture, turn this control clockwise.

#### Note

This control does not affect the output signal of the camera.

### 4 CONTR (contrast) control

Adjusts the contrast of the picture on the viewfinder screen.

#### Note

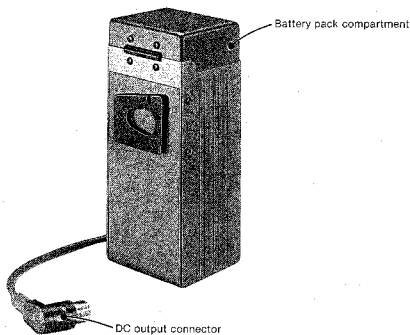
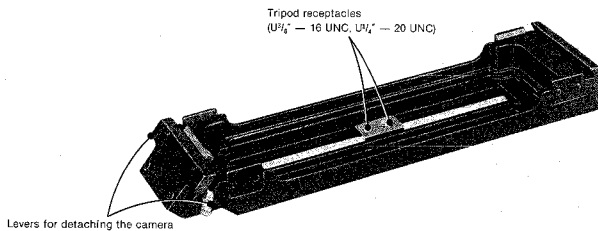
This control does not affect the output signal of the camera.

### 5 TALLY switch

The tally lamp 6 can be activated or deactivated if necessary, by setting this switch to ON or OFF.

### 6 Tally lamp

When the TALLY switch 5 is set to ON, this lamp operates the same as the REC/TALLY indicator 1.

**DC-8 BATTERY ADAPTOR****VCT-M3 TRIPOD ATTACHMENT**

## HOW TO ATTACH THE LENS

- 1 Loosen the mount clamp ring.
- 2 Align and insert the lens into the lens mount.
- 3 Tighten the mount clamp ring to secure the lens.
- 4 Insert the plug into the LENS connector.
- 5 Secure the cord with the cord clamps.

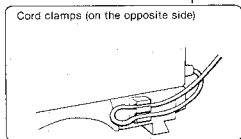
To protect the pickup tubes, set the filter to 0 (blind).

Loosen

Tighten

Set the PREHEAT switch to PREHEAT.

Cord clamps (on the opposite side)



### Notes

- The camera's lens mount is a bayonet mount.
- If the protective cap is placed over the mount of the lens, remove it before attaching the lens.

### How to attach a filter to the lens

As a filter is attached to the lens hood, we recommend detaching the lens hood from the lens first for easier attachment of the filter. Loosen the lens hood lock screw and detach the lens hood.

#### To use a threaded filter

Unscrew the filter holder ring from the lens hood. Then screw the filter into the lens hood. If the filter holder ring is not removed, shading may occur in part of the picture.

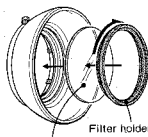
#### To use an unthreaded filter

Unscrew the filter holder ring from the lens hood. Put the filter into the lens hood, then screw the filter holder ring back onto the lens hood.

Lens hood lock screw



Detach the filter holder ring.



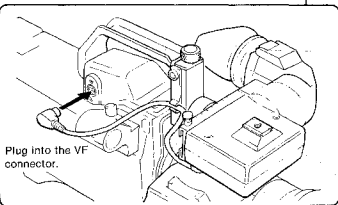
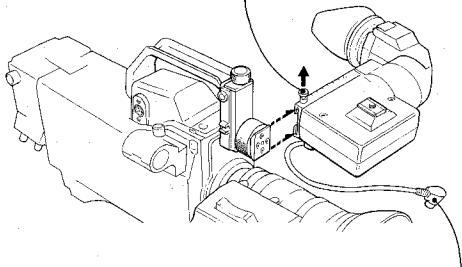
Filter holder ring

Unthreaded filter

## HOW TO ATTACH THE VIEWFINDER

While pulling up on this stopper, align and insert into the receptacle.

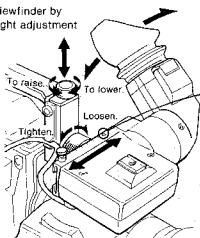
To detach the viewfinder, pull up on the stopper and slide the viewfinder to the left.



Plug into the VF connector.

Adjust the angle of the viewfinder so that the viewfinder is comfortable to use.  
The eye cup can be moved up and down.

Adjust the height of the viewfinder by turning the viewfinder height adjustment knob.

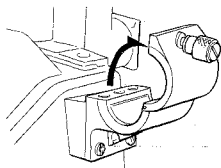
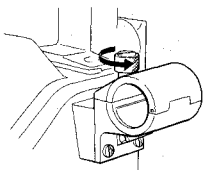


Loosen the lock ring, and slide the viewfinder to the right or left to adjust its position. Then tighten the lock ring.

To put the camera in the carrying case with the viewfinder attached to it, slide the viewfinder to the "▼" mark and tighten the lock ring.

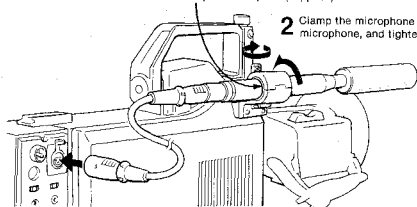
## HOW TO ATTACH THE MICROPHONE

- 1 Loosen the screw and open the microphone holder.



Microphone adaptor\*(supplied)

- 2 Clamp the microphone holder around the microphone, and tighten the screw.

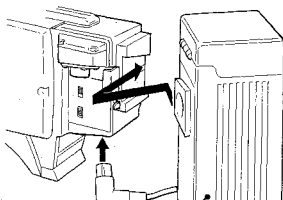


- 3 Connect the microphone cable to the MIC IN connector.

\*If the diameter of the microphone is too small, attach the supplied microphone adaptor to the microphone, then clamp the microphone holder around the microphone.

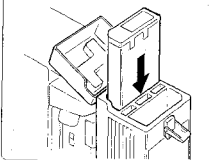
## HOW TO ATTACH THE BATTERY ADAPTOR

- 1 Insert the battery adaptor into the battery adaptor shoe on the camera.



- 2 Connect to the DC IN connector.

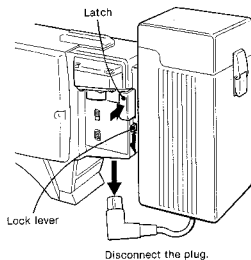
- 3 Insert two NP-1 battery packs into the battery pack compartment.





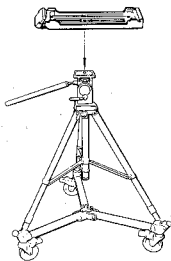
### How to detach the battery adaptor

While pressing down the lock lever, push the latch in.

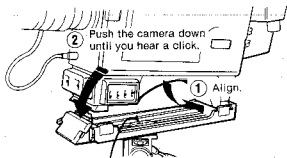


### HOW TO ATTACH THE TRIPOD

- 1 Fit the screw of the tripod into one of the two tripod receptacles.

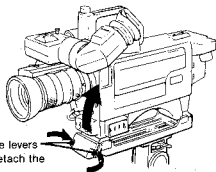


- 2 Attach the camera to the tripod attachment.



- 3 After attaching the camera, loosen the screw of the tripod, and move this fitting forward or backward to the location at which the camera is balanced, then tighten the screw of the tripod again.

### How to detach the camera



While pushing the levers in, pull up and detach the camera.

## 1-5. POWER SOURCES

The DXC-M3A operates on any one of the following four power sources:

- NP-1 battery packs, using the DC-8 battery adaptor
- Power from the portable VTR
- Power from the CCU-M3 camera control unit
- AC power, using the CMA-8 or CMA-7 camera adaptor

### BATTERY PACKS

Use one or two optional NP-1 battery pack(s) when recording outdoors.

Attach the DC-8 battery adaptor to the camera and insert the NP-1 battery pack(s) into the battery adaptor (see "HOW TO ATTACH THE BATTERY ADAPTOR" on page 1-14).

#### Note

When the battery adaptor is connected to the DC IN connector of the camera, the batteries have priority over other power sources.

#### Battery life

Two fully charged NP-1 batteries allow about 2 hours of continuous operation of the camera, viewfinder and zoom lens at normal temperatures. With one battery, operation time will be about 1 hour.

When the batteries are nearly exhausted, the warning "BATT: EMPTY?" appears on the viewfinder screen. If you continue to use the batteries after the "BATT: EMPTY?" warning has appeared, the BATT indicator of the viewfinder also illuminates to indicate that the batteries must be replaced immediately. For details, refer to "WARNING INDICATORS AND CHARACTER DISPLAY" on page 1-30.

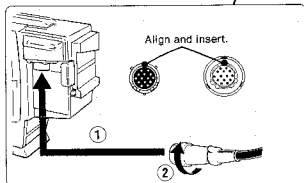
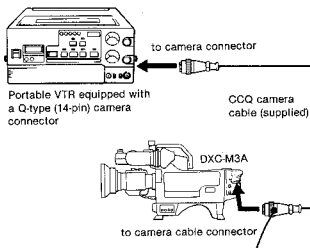
#### Battery charging

Be sure to recharge the NP-1 batteries before every use, using the BC-1WA battery charger. The charging time is about 1 hour at normal temperatures.

For details on recharging, refer to the instruction manual supplied with the battery charger.

### POWER FROM THE PORTABLE VTR

Connect the CAMERA with the portable VTR using the CCQ camera cable (supplied) as illustrated. Power will be supplied from the VTR through the camera cable.

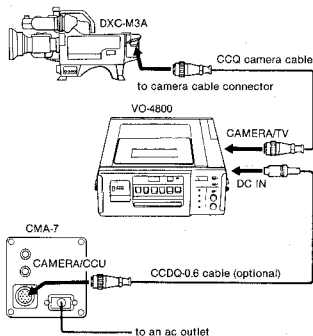


### Notes

●When the portable VTR is operated from rechargeable battery packs, the continuous operating time of the camera and portable VTR is about 1 hour at normal temperatures (when the VO-6800 portable videocassette recorder and two NP-1 battery packs are used). The life of the batteries installed in the portable VTR is indicated by the BATT indicator of the viewfinder. (Refer to page 1-21.)

●Refer to the instruction manual supplied with the VTR for information on the power supply to the VTR.

●When the VO-4800 portable videocassette recorder operates with the AC-340B ac power adaptor, the VTR cannot supply power to the camera. For ac power supply through the VO-4800, use the CMA-7 camera adaptor. Connect the CMA-7 and the VO-4800 using a CCDQ-0.6 cable (optional), as illustrated.



### Caution

●Before operating the camera, make sure that the power supplied from the VTR to the camera is sufficient. If the power supply capacity of the VTR is not sufficient, the camera must be powered independently by the battery packs, using the DC-8 battery adaptor. (Refer to page 1-21.)

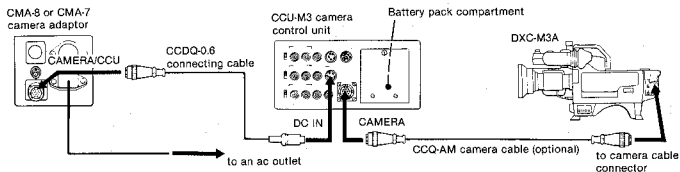
●When a portable VTR equipped with a K-type (14-pin) camera connector is used, the camera must be powered independently by the battery packs using the DC-8 battery adaptor because power is not supplied through the CCQK cable.

## POWER FROM THE CCU-M3 CAMERA CONTROL UNIT

Connect the camera and the CCU-M3 camera control unit using the CCQ-AM camera cable (optional) as illustrated, and set the POWER switch of the CCU to ON. Power will then be supplied from the CCU through the camera cable.

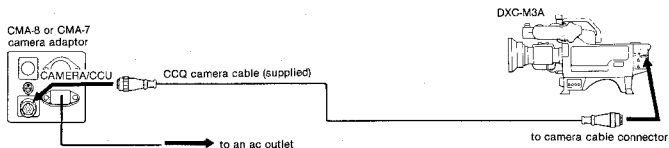
When the CCU is powered by the battery pack, the life of the battery pack installed in the CCU is indicated by the BATT indicator of the viewfinder.

For details on the power sources for the CCU, refer to the instruction manual supplied with the CCU.



## AC POWER

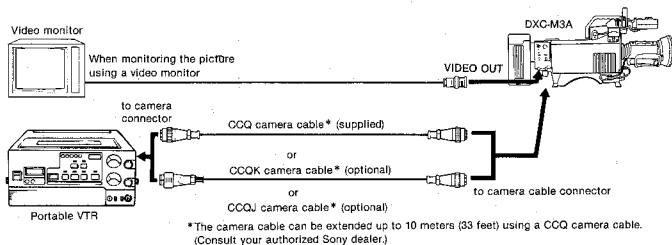
The camera can be operated from an ac power supply using the CMA-8 or CMA-7 camera adaptor (optional). Connect the camera and the camera adaptor, as illustrated, using the supplied CCQ camera cable, and set the POWER switch of the camera adaptor to ON.



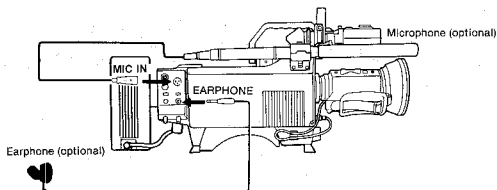
## 1-6. CONNECTIONS

Before making connections, make sure that the power switches of the camera and other equipment are turned OFF. If a large-size viewfinder, such as the Sony DXF-50, is connected to the camera with the camera's POWER and PREHEAT switches set to ON, the camera may malfunction.

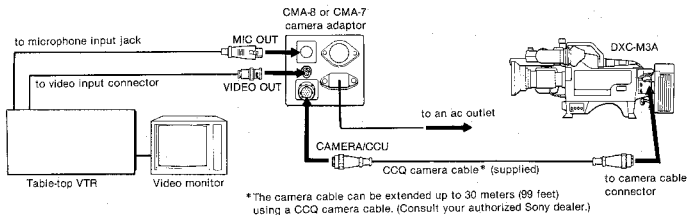
### CONNECTION WITH A PORTABLE VTR



### Connection for simultaneous sound recording



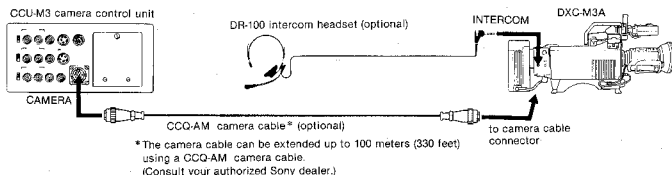
## CONNECTION WITH A TABLE-TOP VTR



### Note

Set the MIC LEVEL selector to either  $-60$  dB or  $-20$  dB, depending on the microphone input level of the VTR.

## CONNECTION WITH THE CCU-M3 CAMERA CONTROL UNIT



### Notes on operation with the CCU-M3

●When the camera is connected to the CCU-M3 camera control unit, set the following selector switches as follows:

- VF VIDEO selector: AUTO
- VTR selector: 1
- MIC LEVEL selector:  $-60$  dB

●When the camera is connected to the CCU, the following switches will not operate: GAIN selector, BARS/WB selector, H PHASE control, SC PHASE control and SC PHASE selector.

●If the W/B BALANCE selector of the CCU is set to PRESET, this setting of the CCU has priority over the setting of the AUTO W/B BAL switch of the camera to WHT. If the W/B BALANCE selector of the CCU is set to MANUAL or AUTO, automatic white balance adjustment will be performed when the AUTO W/B BAL switch of the camera is set to WHT. Automatic black balance adjustment is performed by setting the AUTO W/B BAL switch

of the camera to BLK, irrespective of the position of the W/B BALANCE selector of the CCU.

●The MIC IN connector of the camera cannot be used as an external microphone input. Connect the microphone directly to or through a mixing console, etc., to the VTR.

# OPERATING CONDITIONS OF VTR WHEN CONNECTED TO THE DXC-M3A

VTR selector	MIC LEVEL selector	Connected VTR	Remote control of VTR start/stop	Signal level of camera to VTR	REC lamp		Signal level of REC alarm (VTR to camera)	BATTERY alarm lamp	Audio monitor	VF VIDEO selector			Cable for connection n: cable length	Power supply from VTR to camera (See note 4.)	AC power adaptor for VTR
					REC	VTR alarm				CAMERA (See note 1.)	AUTO (See note 2.)	VTR (See note 3.)			
VTR 1	-20 dB or -60 dB	VO-6800	Yes		Yes	Yes		Yes	Yes	Yes	Yes CAM	Yes VTR	Yes	CCQ-nAR	CMA-8
	-60 dB	VO-4800	Yes		Yes	Yes	H M L	Yes	Yes	Yes	Yes CAM	Yes VTR	Yes	CCQ-nAR	CMA-7 (See note 5.)
		BVU-50	Yes	H L	Yes	Yes	H: +5V M: +2.5V L: 0V	Yes	Yes	Yes	No (The BVU-50 is for recording only.)	No	CCQ-nAR	Yes	AC-500
		BVU-110	Yes	H: 5V, RUN L: 0V, STOP	Yes	Yes	REC lamp lights up at H.	Yes	Yes	Yes	Yes CAM	Yes VTR	Yes	CCQ-nAR	AC-500
		BVH-500A	Yes		Yes	Yes		Yes	Yes	Yes	No VTR	No VTR	Yes	CCQ-nAR	AC-500
		SLO-340	Yes		Yes	No	H L	No	Yes	Yes	No VTR	No VTR	No	CCQJ-2	No
	-20 dB	Others	See note 6.		Yes	No	VTR power	No	No	Yes	Yes CAM	Yes VTR	No	CCQJ-2	No
VTR 2	-20 dB	SL-2000	Yes	+5V 0V Run/stop each time the START/STOP switch is pressed.	Yes	Yes	H L	No	Yes	Yes	Yes CAM	Yes VTR	No	CCQK-2	AC-220
VTR 3	-20 dB	Others	Yes	H L H: VTR power, STOP L: 0V, RUN	Yes	No	VTR power	No	Yes	Yes	Yes CAM	Yes VTR	No	CCQJ-2	No

## Notes

- Even when the VF VIDEO selector is set to CAMERA, the return video can be viewed on the viewfinder screen only while the RET button on the VCL-915BY zoom lens is being pressed. When playback pictures are supplied from the VTR, playback pictures are viewed on the viewfinder screen.
- For VTRs with "No" in the "AUTO" column, set the VF VIDEO selector to CAMERA while the camera is being warmed up and while the VTR is recording, and set the selector to VTR for viewing playback pictures from the VTR.
- For VTRs with "No" in the "VTR" column, signals other than the playback signals are supplied to the camera while the VTR is recording, so the viewfinder is not operable.
- For VTRs with "No" in this column, the power supply capacity from the VTR is insufficient to operate the camera. For this reason, the DC-8 battery adaptor (and the battery pack) must be installed onto the camera. If the camera is operated without the battery adaptor, heat will build up in the VTR or ac power adaptor, and the protection circuit will activate.
- The CMA-7 camera adaptor must be used for the VO-4800, because the power supply capacity of the AC-340B ac power adaptor is insufficient to operate the camera.
- For some VTRs, a switch inside the camera must be switched. Consult your authorized Sony dealer.

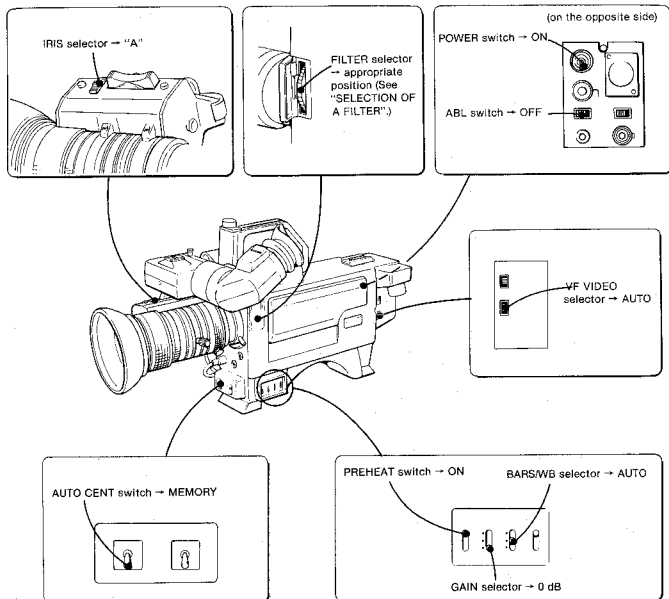
## 1-7. ADJUSTMENTS

### PREPARATION

#### Caution

To protect the pickup tubes, avoid letting light enter the pickup tubes before turning on the camera.

Check to be sure that the connections are made correctly, and set the switches as shown.



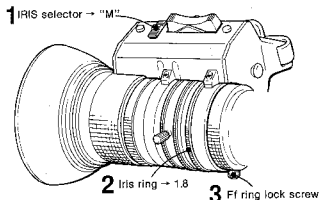
Remove the lens cap, and point the camera at the object. While zooming in or out, turn the focus ring to focus the picture.



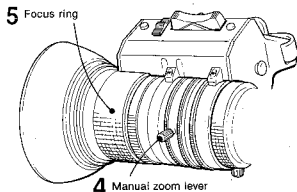
## FLANGE FOCAL LENGTH ADJUSTMENT

The proper flange focal length adjustment insures that the object is in focus both at the wide-angle position and at the telephoto position when zooming.

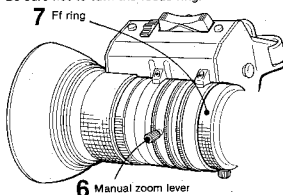
- 1 Set the IRIS selector to "M".
  - 2 Set the iris ring to "1.8".
- Position an appropriate object and illuminate it so that the proper video level is obtained when the iris ring is set to "1.8".
- 3 Loosen the Ff ring lock screw.



- 4 Set the ZOOM selector to MANU and turn the manual zoom lever to the "143" telephoto position.
- 5 Turn the focus ring until an object at about three meters (10 feet) from the lens is in focus. An object with fine detail is desirable.



- 6 Turn the manual zoom lever to the "9.5" wide-angle position.
- 7 Turn the Ff ring until the same object is in focus. Be sure not to turn the focus ring.

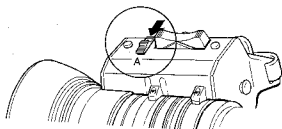


- 8 Repeat steps 4 through 7 until the object is in focus both at the telephoto position and at the wide-angle position.
  - 9 Tighten the Ff ring lock screw.
- Once the flange focal length adjustment has been made, readjustment is not necessary as long as the lens stays mounted on the same camera.

## IRIS ADJUSTMENT

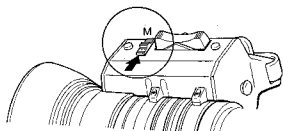
### Automatic adjustment

Set the IRIS selector to "A", and the iris will be automatically adjusted to the brightness of the object. Normally use the "A" position.



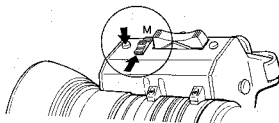
### Manual adjustment

Set the IRIS selector to "M", and turn the iris ring. Manual adjustment may be effective when recording an object against a bright sky or a scene with high contrast.



### Temporary automatic adjustment

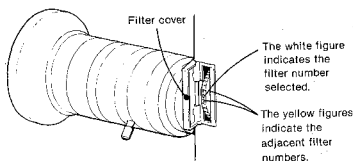
While the momentary automatic iris adjustment button is kept depressed during manual iris adjustment, the iris is automatically adjusted. When the button is released, the iris will be fixed at the value that has just been obtained until the iris is adjusted again manually.



## SELECTION OF A FILTER

The color temperature changes with the changes in lighting conditions. To compensate for changes in the color temperature, use the color temperature conversion filter indicated in the table below.

Filter number	Lighting conditions
0	Blind
1	Iodine lamp, sunrise, sunset
2	Bright outdoor
3	Cloudy, rainy



If the selected filter is not suitable for the lighting conditions, a character display warning, such as "LOW LIGHT", will be shown on the viewfinder screen. For details on the character display, refer to "WARNING INDICATORS AND CHARACTER DISPLAY" on page 1-30.

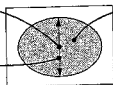
## WHITE BALANCE AND BLACK BALANCE ADJUSTMENTS

The white balance and black balance should be correctly adjusted for lifelike color reproduction and a clear picture.

- 1 Set the FILTER selector to the position corresponding to the lighting conditions.
- 2 Set the BARS/WB selector to AUTO.
- 3 Zoom up on a white pattern with the same lighting conditions as those under which the recording will be made. A white object such as a white cloth, white wall, etc., can be used instead of a white pattern. The minimum white area required for adjustment is as follows.

Center of the screen and center of the oval

Shorter axis: about 80% of the height of the screen



Place the white object in the oval. The area of the object should be at least 10% of the area of the screen. No light object should appear inside this oval.

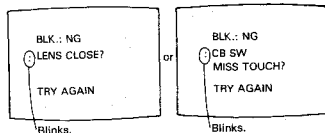
- 4 Set the IRIS selector of the zoom lens to "A".
- 5 Set the AUTO W/B BAL switch to BLK. The switch automatically returns to the center position when it is released. While the black balance is being automatically adjusted, the lens iris is automatically closed and "BLK.: OP" is displayed on the viewfinder screen. After a few seconds, the automatic black balance adjustment is finished, and the character display on the viewfinder screen changes to "BLK.: OK". The character display will go off after a few seconds. The adjusted value will be memorized.  
If the automatic black balance adjustment function does not activate normally, "BLK.:NG" will be displayed on the viewfinder screen. If this happens, refer to "If the automatic black balance adjustment function does not activate normally" and try the black balance adjustment again.
- 6 Set the AUTO W/B BAL switch to WHT. While the white balance is being automatically adjusted, "WHT.: OP" is displayed on the viewfinder screen. After a few seconds, the automatic white balance adjustment is finished, and the character display on the viewfinder screen changes to "WHT.: OK". The adjusted value will be memorized, and the character display on the screen will go off after a few seconds. If the automatic white balance adjustment function does not activate normally, "WHT.: NG" will be displayed on the viewfinder screen. If this happens, refer to "If the automatic white balance adjustment function does not activate normally" and try the white balance adjustment again.

### Note

When the lighting of the object is changed, adjust the white balance only. Readjustment of the black balance is not required.

If the automatic black balance adjustment function does not activate normally

The following will be displayed on the viewfinder screen.

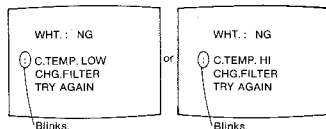


"LENS CLOSE?" is displayed if the lens iris does not close automatically after the AUTO W/B BAL switch is set to BLK due to a malfunction of the lens or an incorrect connection of the lens plug. "CB SW MISS TOUCH?" is displayed if the BARS/WB selector is set to BARS by mistake while the black balance is being adjusted. If this happens, check the function of the lens

and the connection of the lens plug and/or reset the BARS/WB selector to AUTO, then try the black balance adjustment again.

#### If the automatic white balance adjustment function does not activate normally

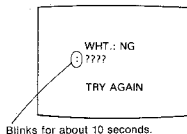
If the color temperature is out of the automatic control range, the following will be displayed on the viewfinder screen.



If this happens, change the color temperature conversion filter and try the white balance adjustment again.

#### Notes

- When "LOW LIGHT" is displayed on the viewfinder screen, the "WHT.: NG" indication appears above the "LOW LIGHT" indication. If the light is insufficient, add illumination or raise the video output level with the GAIN selector, then try the white balance adjustment again. Note that when the automatic white balance adjustment is performed while the "LOW LIGHT" indication is OFF, the "LOW LIGHT" indication is automatically set to ON.
- If the white balance is adjusted when any light has appeared on the viewfinder screen inside the minimum white area required for automatic white balance adjustment or while shooting a colored object, the following may be displayed.



If this happens, try the white balance adjustment again using the white pattern or white object.

**Memorizing the white balance and black balance values**  
In the DXC-M3A, a built-in memory stores the adjusted white balance and black balance values. The memorized values will be kept for about a week after the power is turned off or until readjustment. The memory function does not require an external power supply. If more than one week has passed after the power has been turned off, "MEMORY NG" will be displayed on the viewfinder screen, indicating that the memorized values are no longer retained. If this happens, adjust the white balance and black balance again.

#### If you want to start recording without the delay caused by the need to adjust the white balance

Set the BARS/WB selector to 3200°K. The approximate white balance (the value preset at the factory, i.e. the value of 3200°K with the FILTER selector set to "1") can be obtained.

#### BLACK SETTING

When the AUTO W/B BAL switch is set to BLK, the black level drift of each pickup tube with respect to the reference black level is automatically adjusted, together with the black balance.

#### CENTERING ADJUSTMENT

Though the centering of the R, G and B pickup tubes has been adjusted at the factory, it may be affected by mechanical vibration or shock to the camera or changes in temperature. We recommend, therefore, readjusting the centering. To readjust the centering, first adjust the white balance beforehand as described in "WHITE BALANCE AND BLACK BALANCE ADJUSTMENTS" on page 1-24, and then proceed as follows.

- 1 Set the AUTO CENT switch to MEMORY.
- 2 Set the IRIS selector on the lens to "A". Check to be sure that the iris is not fully open. If the iris is fully open, add illumination.
- 3 Shoot the supplied chart, a registration chart or a test object.

**When using the supplied chart or a registration chart:** Adjust the camera so that the chart fills the screen.

**When using a test object:** Adjust the camera so that the test object falls within a circle whose center is at the center of the screen and whose diameter is 70% of the height of the screen.

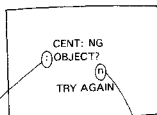
#### Note

An object which does not meet the following requirements may cause "TRY AGAIN" to be displayed on the viewfinder screen. Therefore, we recommend using the supplied chart or a registration chart.

- Use a test object which has both horizontal and vertical lines with appropriate contrast. Do not use an object with only horizontal or only vertical lines or an object with diagonal lines in one plane.
  - If possible, use a black-and-white picture so that the level of the R, G, and B will be nearly the same. An object of one color or with one deep color may cause a centering error.
  - Do not use a moving object, and do not move the camera during adjustment.
- 4 Set the AUTO CENT switch to START. The switch automatically returns to the MEMORY position when it is released. While the centering is being automatically adjusted, "CENT: OP" is displayed on the viewfinder screen, and when the adjustment is completed after about four seconds, "CENT: OK" is displayed. The adjusted centering value is memorized, and the character display "CENT: OK" goes off after about five seconds.
- If the automatic centering adjustment function does not activate normally, "CENT: NG" will be displayed on the viewfinder screen. For details, refer to "If the automatic centering adjustment function does not activate normally".
- 5 Adjust the white balance again as a centering error may have affected the white balance.

**If the automatic centering adjustment function does not activate normally**

The following will be displayed on the viewfinder screen.



Blinks for about 10 seconds.

A two-digit number which indicates a problem with the object being shot is displayed here. The significant digit is the tens digit, which will be either "0" or "1".

A "0" may mean that the object does not have both horizontal and vertical lines and/or does not have sufficient contrast and/or when the video output level is insufficient.

A "1" may mean that the object has only one color or deep color.

If this happens, automatic centering adjustment has not been properly performed. Check that:

- the object meets the requirements for automatic centering adjustment mentioned above in "Note" in step 3,
- the iris setting is correct,
- the illumination is sufficient,
- the object is in focus, and

— the object has not moved or the camera has not been moved during adjustment.

If not, correct the problem and readjust the centering again.

**Memorizing the centering value**

The adjusted centering value can be memorized in the same way as the white balance and black balance values and can be kept for about one week after the power has been turned off. If more than one week has passed after the power has been turned off, the value will be reset to the factory-set value. Should the memorized value be erased, "MEMORY NG" will be displayed on the viewfinder screen. If this happens, perform the centering adjustment again.

**VIDEO MONITOR ADJUSTMENT**

When a color video monitor is being used to monitor a picture, adjust the color of the monitor using the color bar signals supplied from the camera.

- 1 Set the BARS/WB selector to BARS.
- 2 Adjust the color and hue controls on the monitor while viewing the color bars on the monitor screen.
- 3 Set the BARS/WB selector to AUTO.

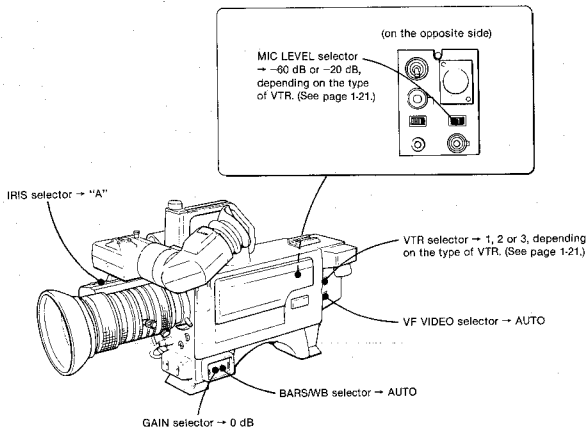
**Note**

The color bar signals can also be used to adjust the contrast and brightness of the viewfinder. After adjustment, return the BARS/WB selector to AUTO.

## 1-8. OPERATION

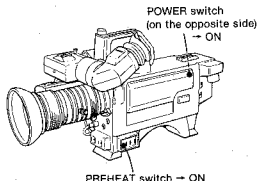
### PREPARATION

Before operation, set the switches as follows.



### RECORDING WITH A PORTABLE VTR

- 1 Turn the camera and the connected equipment on.



#### Note

For a brief period after the camera has been turned on, the BATT indicator of the viewfinder will light and random characters will be displayed on the viewfinder screen. (This is not a malfunction.)

- 2 Select the appropriate filter.
- 3 Adjust the black balance and white balance. For details, refer to "WHITE BALANCE AND BLACK BALANCE ADJUSTMENTS" on page 1-24.

- 4 Point the camera at the object and adjust the lens.  
— Iris (Refer to page 1-23.)  
— Zoom (Refer to page 1-29.)  
— Focus

- 5 To start recording, press the VTR START/RETURN VIDEO button on the camera or the VTR button on the lens. The REC/TALLY indicator in the viewfinder will light during recording.  
To stop recording, press the VTR START/RETURN VIDEO button or the VTR button again.

#### Preparation of battery packs

Two NP-1 battery packs operate the camera continuously for about 2 hours. Be sure to use fully charged batteries. Storing spare fully charged batteries in the carrying case is recommended.

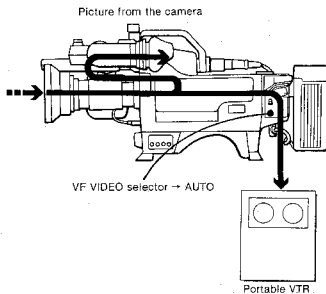
#### Monitoring the sound

You can monitor the sound during both recording and playback through an earphone connected to the EARPHONE jack of the camera.

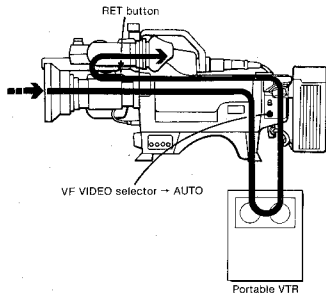
### Monitoring the picture

The following pictures can be seen on the viewfinder screen when the camera and the VTR are connected with the CCQ camera cable and the VF VIDEO selector is set to AUTO. (For details on the pictures which can be shown on the viewfinder screen, refer to page 1-6 and 1-21.)

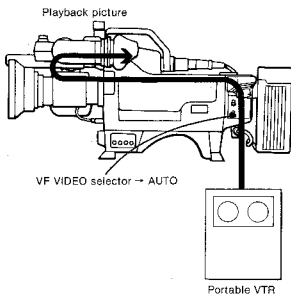
#### During recording



E-E mode picture from the VTR (return video) when the RET button on the lens is pressed



#### During playback



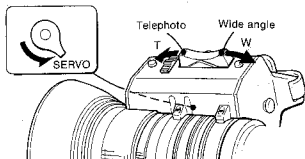
#### Note

While the playback picture from the VTR is displayed on the viewfinder screen, a part of the camera's video signals, such as a sync signal, may be mixed with the playback picture so that streaks of noise roll vertically or horizontally.

## ZOOMING

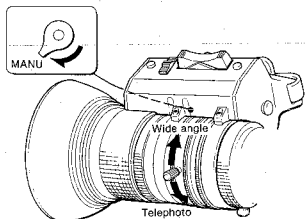
### Motorized zooming

You can zoom smoothly by pressing either end of the motorized zoom switch when the ZOOM selector is set to SERVO. Zooming is fast when the motorized zoom switch is pressed down all the way and becomes slower when the switch is pressed down only slightly.



### Manual zooming

Manual zooming allows more precise control of the zooming speed. You can zoom manually by manipulating the manual zoom lever with the ZOOM selector set to MANU.



#### Tips on zooming

**Zoom in:** From wide angle to telephoto. Used to bring a distant object up close.

**Zoom out:** From telephoto to wide angle. Used to move back from an object and gradually reveal the object's surroundings.

**Following:** Zoom up on the subject and follow its movement with the camera. This zoom effect is used, for example, to emphasize the speed of the subject by making the background rush past in a blur.

**Correct focusing:** If the focus is right in the telephoto position, it will be right when you zoom back to wide angle.

**For a more stable picture,** we recommend placing the camera on a tripod when zooming. If you zoom with the camera on your shoulder, stand as steady as possible.

## OUTPUT LEVEL ADJUSTMENT

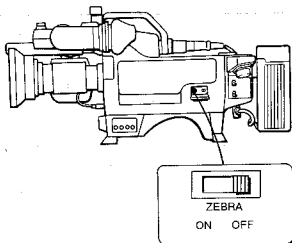
The video output level can be raised by 9 dB by setting the GAIN selector to "9" and by 18 dB by setting the selector to "18". If a clear picture cannot be obtained because of insufficient lighting, set the GAIN selector to the appropriate position. Normally set the GAIN selector to "0".



## CHECKING THE VIDEO LEVEL

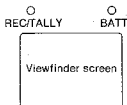
When the ZEBRA switch is set to ON, a zebra pattern will appear on the part of the viewfinder screen where the video level of the picture is 70% to 80% in IRE unit. You can use this zebra pattern as a reference when adjusting the iris manually. Adjust the iris so that the zebra pattern appears over the subject being shot (for example, the face of a back-lit person).

If it is not necessary to use the zebra pattern to adjust the iris, set the ZEBRA switch to OFF.



## WARNING INDICATORS AND CHARACTER DISPLAY

### Warning indicators in the viewfinder



#### (1) REC/TALLY indicator

##### During recording:

When a VTR equipped with a Q-type or K-type camera connector is used, this indicator blinks until the servo locks, and then lights steadily during recording.

##### Warning indicator:

When a VTR equipped with a Q-type or K-type camera connector and a warning system (for example, the Sony VO-6800) is used, this indicator lights in the same way as the warning lamps of the VTR. For details, refer to the instruction manual of the VTR.

##### Tally indication:

When a CCU-M3 camera control unit is connected to the camera, this indicator functions as a tally lamp.

#### (2) BATT indicator

The indicator starts blinking several minutes before the battery of the VTR or CCU is discharged to a level at which the VTR or CCU cannot be operated (about 11 V), and lights steadily when the battery has discharged to that level. If the battery of the VTR or CCU is discharged further to below this level, the power to the VTR or CCU is automatically shut off to prevent the battery from over-discharging and the BATT indicator goes off. The indicator blinks quickly when the controls or switches of the CCU are operated.

##### Note

Be sure to replace the battery with a fully-charged one soon after the BATT indicator starts blinking. If you continue recording with a weak battery, you may not get optimum results.

### Warning indication by character display

The following warnings are indicated on the viewfinder screen with a blinking colon (:).

#### :LOW LIGHT

This indication appears when the light is insufficient. If it is not necessary to use the "LOW LIGHT" indication displayed to monitor the lighting, press the DOWN/OFF button. "LOW LIGHT" will not appear even under insufficient lighting conditions. To have the "LOW LIGHT" indication displayed again when light is insufficient, press the UP/ON button.

#### :MEMORY NG

This indication appears when the values of white balance, black balance and centering are no longer retained in the memory.

#### :BATT: EMPTY?

This indication appears when the voltage of the batteries installed in the battery adaptor for the camera falls to 11.2 V (even when the battery voltage inside the VTR is more than 11.2 V). When this indication appears on the viewfinder screen, the batteries must be replaced as soon as possible. If you continue to use the batteries and the batteries are discharged to below 11.0 V, the BATT indicator of the viewfinder also lights. When this happens, replace the batteries immediately. If you still continue to use the batteries, the quality of the recorded picture will deteriorate.

These warnings will disappear when the problem is eliminated.

### Character display

The character display function is convenient for inserting a title, date, etc., during recording.

The DISP CHG switch to be used for character display has several functions. When the camera is turned on, the viewfinder screen is in the warning indication mode (1). Each time the DISP CHG switch is pressed after this mode, the character display on the viewfinder screen changes in the following order: (2) operational state indication, (3) initial indication of title setting and display of set title characters, (4) reference level setting for automatic iris adjustment, and (5) master pedestal level setting. When the DISP CHG switch is pressed once more, the character display returns to the warning indication mode (1).

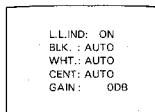
In each of these character display modes, the UP/ON and DOWN/OFF buttons have different functions.





# Operational state indication

When the DISP CHG switch is pressed while the viewfinder screen is in the warning indication mode, the operational state of the camera is displayed on the viewfinder screen as follows:



**LLIND:** The "LOW LIGHT" warning indication can be switched ON or OFF using the UP/ON or DOWN/OFF button. If you do not need the "LOW LIGHT" indication to monitor the lighting conditions, press the DOWN/OFF button. The top line of the character display changes to "LLIND: OFF".

**BLK.:** The setting mode of the black balance adjustment is indicated: AUTO or MANUAL.

**AUTO:** The black balance can be adjusted automatically.

**MANUAL:** The black balance can be adjusted manually with the black balance adjustment switch of the CCU-M3 camera control unit.

**WHT.:** The setting mode of the white balance adjustment is indicated: AUTO, PRESET or MANUAL.

**AUTO:** The white balance can be adjusted automatically.

**PRESET:** The white balance is set to the value preset at the factory.

**MANUAL:** The white balance can be adjusted manually with the white balance adjustment switch of the CCU-M3 camera control unit.

**CENT:** The setting mode of the centering adjustment is indicated: AUTO or PRESET.

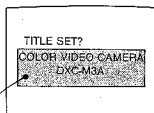
**AUTO:** The centering can be adjusted automatically.

**PRESET:** The centering is set to the value preset at the factory.

**GAIN:** The setting of the video output level is indicated: 0 dB, 9 dB or 18 dB.

## Initial indication of title setting

When the DISP CHG switch is pressed again, the following is displayed:



If any characters are stored in the memory, they are displayed here.

If it is not necessary to set title characters, press the DISP CHG switch. The character display will change to the next display mode.

If title characters are to be set or cleared, first press the UP/ON or DOWN/OFF button once as follows:

To insert title characters in the upper part of the viewfinder (or monitor) screen, press the DOWN/OFF button. The title character display will jump up to the upper part of the screen. To return the display to the lower part of the screen, press the DOWN/OFF button again.

## Note

When the camera is used with a VO-6800 portable VTR, use the lower character display area because the tape remaining time of the VTR is shown in the upper character display area.

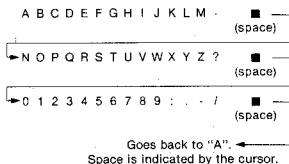
To clear all the memorized title characters, press the UP/ON and DOWN/OFF buttons simultaneously.

To set title characters, press the UP/ON button. A blinking cursor indicating the position of the character will appear at the bottom right corner of the display area.

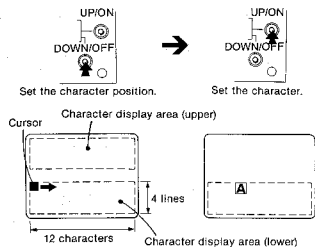
## Setting the title characters

Position the cursor with the DOWN/OFF button and set the character with the UP/ON button. Each time the DOWN/OFF button is pressed, the cursor moves one space to the right. When the DOWN/OFF button is kept depressed, the cursor moves fast. When the UP/ON button is kept pressed while the DOWN/OFF button is held down, the cursor moves rapidly back to the left. Each time the UP/ON button is pressed, the character being displayed at the cursor position changes in alphabetical order. When the UP/ON button is kept depressed, the characters change rapidly. When the DOWN/OFF button is kept pressed while the UP/ON button is held down, the characters change in reverse alphabetical order. Characters, numbers, and punctuation marks such as "?" and "." can be displayed.

Order of scanning →



Up to 12 characters can be displayed on one line, and up to four lines can be displayed.



After setting all the title characters, move the cursor to a position where no character is set so that no set character blinks.

The characters being displayed on the viewfinder screen are output from both the camera cable connector (14-pin) and the VIDEO OUT connector (BNC type). They are recorded and superimposed on the monitor screen.

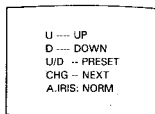
The set characters and their display positions are stored in the memory (for about one week) even after the character display mode has been changed to the next mode or even when the power is off.

The characters are normally displayed in white, but the color of the characters can be changed by changing the setting of the DIP switch inside the camera. To change the color of the characters, consult your authorized Sony dealer.

#### Note

The AUTO W/B BAL switch can also be used for character setting instead of the UP/ON and DOWN/OFF buttons. To set the character position, set the switch to BLK (same function as the DOWN/OFF button), and to set the character, set the switch to WHT (same function as the UP/ON button).

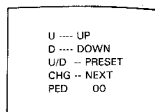
Setting the reference level for automatic iris adjustment  
If it is not necessary to display and record title characters, press the DISP CHG switch. The viewfinder screen display changes as follows:



In this mode, the reference level for automatic iris adjustment can be changed within a range from -1.0 to 1.0 F stop in 0.5 steps. To raise the level, press the UP/ON button. To lower the level, press the DOWN/OFF button. When the UP/ON and DOWN/OFF buttons are pressed simultaneously, the value is reset to the normal level (factory preset level). The reference level will be reset to the normal level when the camera is turned on again after it has been turned off. This function is used, for example, to adjust the video level of a back-lit subject so that it is not too dark.

#### Setting the master pedestal level

After setting the reference level for automatic iris adjustment, press the DISP CHG switch again. The following will be displayed:



In this mode, the deviation from the standard master pedestal level (indicated by "00") is shown on the bottom line in %. (This is an approximate percentage.) The master pedestal level can be changed in 1% steps from about -30% to +31% of the reference level (0.7 V as 100%). (When the master pedestal level is below -30%, "MIN" is displayed and when it is above +31%, "MAX" is displayed.) To raise the level, press the UP/ON button. To lower the level, press the DOWN/OFF button. When the UP/ON and DOWN/OFF buttons are pressed simultaneously, the value is reset to "00". This function is used, for example, to obtain a well-contrasted picture while shooting outdoors.

The master pedestal level set in this mode is stored in the memory even when the power is off (for about one week).

When the DISP CHG switch is pressed after the master pedestal level is set, the character display on the viewfinder screen returns to the first warning indication mode.

#### Notes

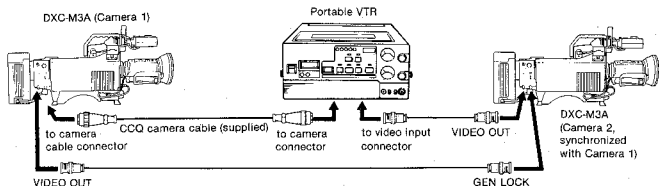
● If the pedestal level set with the UP/ON and DOWN/OFF buttons is to be monitored on a waveform monitor, set the ABL switch to OFF. If the ABL switch is set to ON, the correct waveform cannot be monitored.

● When a CCU-M3 camera control unit is connected to the camera, the auto iris reference level setting mode and the master pedestal level setting mode are skipped because the iris and the master pedestal level set by the CCU have priority over the settings on this camera.

● The master pedestal level set by the CCU is stored in the memory of the camera for about one week. After the CCU is disconnected from the camera, the memorized master pedestal level can be changed on the camera, if necessary.

## USE OF THE GEN LOCK CONNECTOR

When the BS or VBS signal is connected to the GEN LOCK connector, the camera synchronizes with the connected signal. Use this connector when two or more cameras are used without a CCU.



## RECORDING WITH A TABLE-TOP VTR

The operating procedure is almost the same as when recording with a portable VTR except for the following:

- The VTR START/RETURN VIDEO button on the camera and the VTR button on the lens do not function. Recording must be started and stopped with the function buttons on the VTR.
- The REC/TALLY indicator in the viewfinder does not function.
- The E-E mode picture (return video) and the playback picture cannot be monitored on the viewfinder screen.

## TIPS FOR SHOOTING AND EFFECTIVE CAMERA WORK

### RECORDING LIVELIKE COLORS

If the camera is used without correct white balance adjustment, proper color reproduction cannot be obtained. Even in the same location, the color temperature will vary with the time of the day and the lighting conditions (sunlight, shade, ambient reflected light, etc.). Be sure to attach the filter appropriate to the color temperature of the lighting and adjust the white balance when the camera is moved to another location.

### LIGHTING

For optimum color recording, we recommend illuminating the object with two iodine lamps (500 watts, 3200°K) at a distance of 4 m (13 feet) to obtain suitable lighting conditions (i.e., an intensity of at least 1,500 lux, 150 footcandles). If the illumination is insufficient, the "LOW LIGHT" warning will be displayed on the viewfinder screen. If this occurs, the video output level must be raised manually or illumination must be added. Lights should be arranged and their intensity set so that the object is illuminated evenly with sufficient brightness. When installing the lighting system, refer to the light distribution curve of the lamp used. Undesirable shadows may be a problem when illuminating a three-dimensional object. The color of the shaded areas may be affected and appear as a different color. To reduce this effect, illuminate the object as uniformly as possible. The use of a light, pale-colored background, such as pale gray, is recommended.

### FOCUSING AND ZOOMING

Focusing is always more critical in the telephoto position.

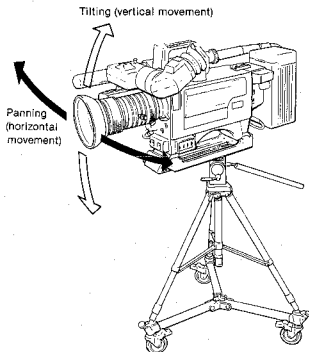
Therefore, if you start by accurately focusing for a telephoto shot, you are sure to be accurately focused when you zoom back to a more wide-angle shot. In the telephoto position, the "depth of focus" is very shallow, so only one point in the scene is likely to be in focus. Shooting a distant object means focusing over a wide range, but when shooting something close, you naturally only have to focus over a much narrower range. The narrower the angle of the lens, or in other words the more telephoto it becomes, the more pronounced camera shake will be. If you are taking a telephoto shot, be sure that the camera is held very still.

### PANNING AND TILTING

These techniques are used for "sweeping" the camera over landscapes, tall buildings, etc.

Hold the camera still for a moment just before you start to shoot and just after the shot has finished. Start shooting: turn the camera slowly around to the point where the shot will end. This type of slow horizontal sweep is called "panning".

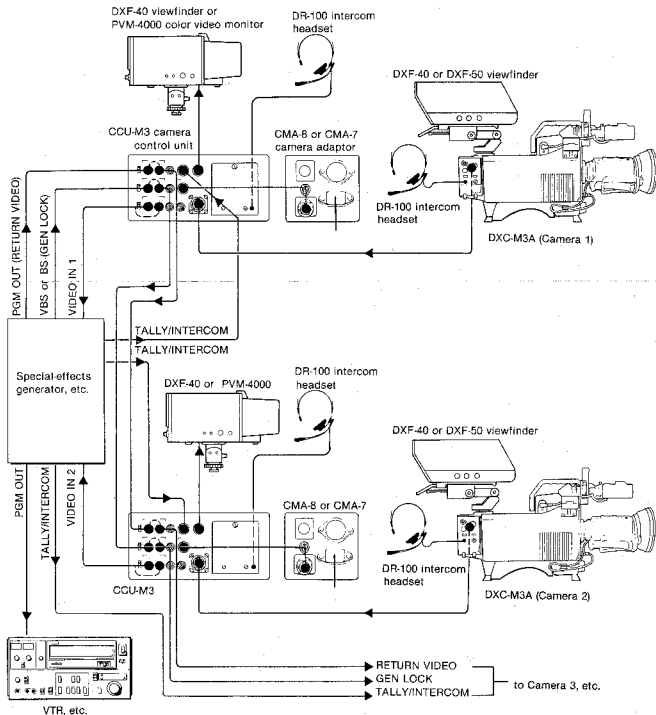
Tilting is when the camera is swept vertically for shots of buildings, trees, mountains and so on. You can either start from the top and work down or start at the bottom and work up. A subtly different effect is achieved, depending on which way you do it. If you are shooting a skyscraper and want to emphasize the height, start from the bottom and tilt up. If, on the other hand, you want to dramatize a person emerging from the front entrance, start at the top and tilt down. Tilting is generally more effective if you sweep the camera more quickly than you would when panning.



## STUDIO USE

When using more than two cameras simultaneously in a video studio, a special-effects generator, such as the Sony SEG-2000A, is necessary for wiping and switching, and a CCU-M3 camera control unit for matching the picture quality and color of all the cameras.

### System example

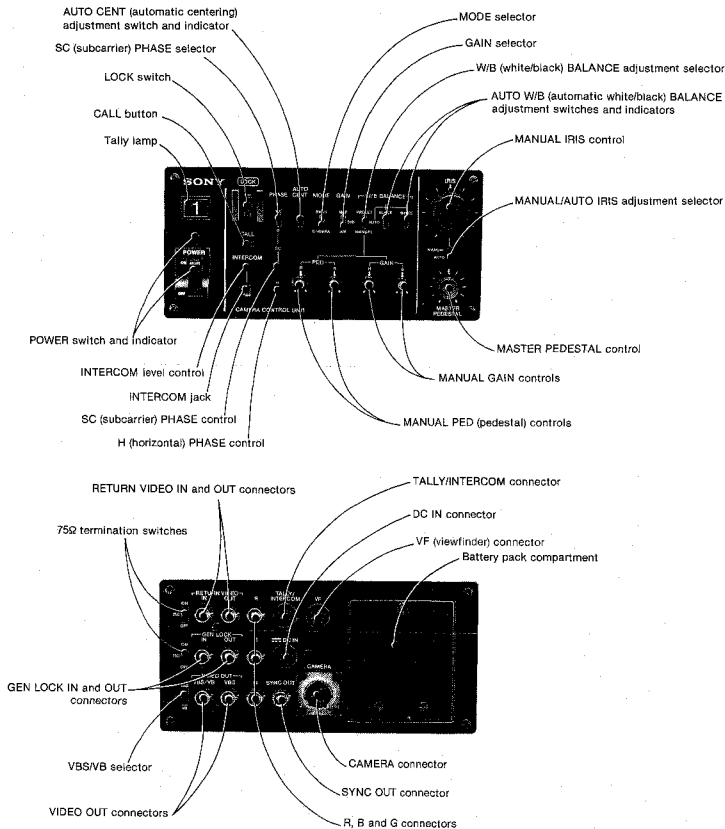


For installation of the DXF-40 or DXF-50 viewfinder, refer to the instruction manual of each viewfinder.

**CCU-M3 camera control unit (optional)**

The CCU-M3 is a camera control unit designed specially for use with the DXC-M3/DXC-M3A. The operation and

adjustment of the camera can be remotely controlled by the CCU-M3. For details, refer to the instruction manual of the CCU-M3.

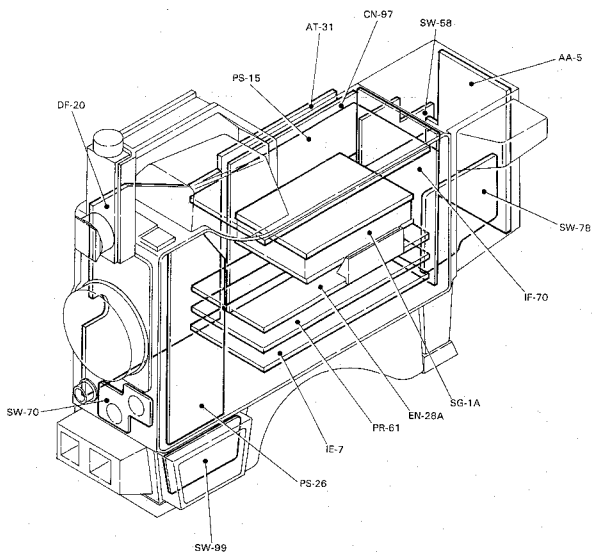
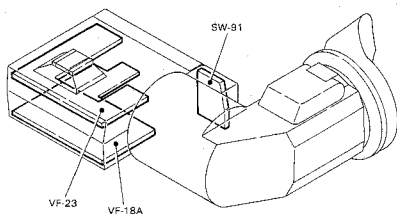






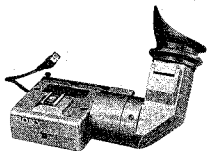
## SECTION 2 INSTALLATION

### 2-1. BOARDS LAYOUT



## 2-2. ACCESSORIES SUPPLIED

**Electronic Viewfinder (DXF-M3A):** number of "1"

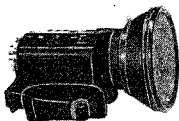


**Tripod Attachment (VCT-M3):** number of "1"

This is the fixed mount for the attached camera at the tripod.

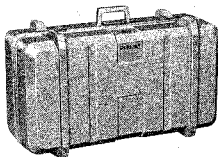


**Zoom Lens (VCL-915BY):** number of "1"



**Carrying-case:** number of "1"

This stores the camera with the lens and viewfinder attached. This will protect the camera from the damage caused by outside pressure.

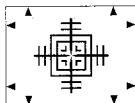


**Camera cable (CCZQ-2):** number of "1"

Use this when connecting the camera with the 14P VTR or CMA-7/7CE AC adaptor.



**Automatic centering chart:** number of "1"



	DXC-M3A	DXC-M3AK	DXC-M3AH
Color video camera DXC-M3A	○	○	○
Zoom lens VCL-915BY	×	○	×
Viewfinder DXF-M3A	○	○	×
Battery adaptor DC-8	○	○	×
Tripod attachment VCT-M3	○	○	○
Carrying case LC-M3A	○	○	×
Camera cable CCQ-2AR	○	○	○
Chart for automatic centering adjustment	○	○	○

○: Supplied, ×: No. supplied

## 2-3. CONNECTORS AND CABLES

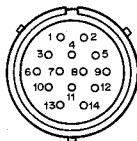
### 2-3-1. Connector Input/Output signals

The main connector input/output signals are as follows:

VIDEO OUT; 10Vp-p  $\pm$  0.1V, sync negative  
75  $\Omega$

GEN LOCK; 1.0Vp-p, sync negative  
75  $\Omega$

VTR/CCU (14P)



(EXT VIEW)

CCU		Pin No.	VTR	
REMARK FOR SIGNAL	SIGNAL		SIGNAL	REMARK FOR SIGNAL
10.6V~17V, 3A	UNREG GND	1	UNREG GND	10.6V~17V, 3A
	UNREG +12V IN	2	UNREG +12V IN	
-20dBs, 600 $\Omega$	INCOM OUT (X)	3	MIC OUT (X)	-60dBs, 600 $\Omega$
	INCOM OUT (Y)	4	MIC OUT (Y)	
	INCOM OUT (G)	5	MIC OUT (G)	
1.0Vp-p, 75 $\Omega$	COMPOSITE VIDEO OUT (X)	6	COMPOSITE VIDEO OUT (X)	1.0Vp-p, 75 $\Omega$
	COMPOSITE VIDEO OUT (G)	7	COMPOSITE VIDEO OUT (G)	
1.0Vp-p, 75 $\Omega$	RETURN VIDEO IN (G)	8	RETURN VIDEO IN (G)	1.0Vp-p, 75 $\Omega$
	RETURN VIDEO IN (X)	9	RETURN VIDEO IN (X)	
This signal is used for controlling CCU.	SERIAL DATA IN/OUT	10	BATTERY ALARM IN	(Note 1)
0.7Vp-p, 75 $\Omega$	R OUT (X)	11	COLOR FRAMING PULSE OUT	This signal is not used in VTR.
0.7Vp-p, 75 $\Omega$	G OUT (X)	12	REC/ALARM IN	(Note 2)
ON; 4.5 $\pm$ 0.5Vdc OFF; 0 $\pm$ 0.5Vdc	TALLY IN	13	VTR START/STOP OUT	START; 4.5 $\pm$ 0.5Vdc STOP; 0 $\pm$ 0.5Vdc
0.7Vp-p, 75 $\Omega$	B OUT (X)	14	POWER SAVE OUT/ AUDIO MONITOR IN	SAVE; 4.5 $\pm$ 0.5Vdc (across 10k $\Omega$ ) STANDBY; 9.0 $\pm$ 0.5Vdc (across 10k $\Omega$ ) MONITOR; -6dB, 750 $\Omega$

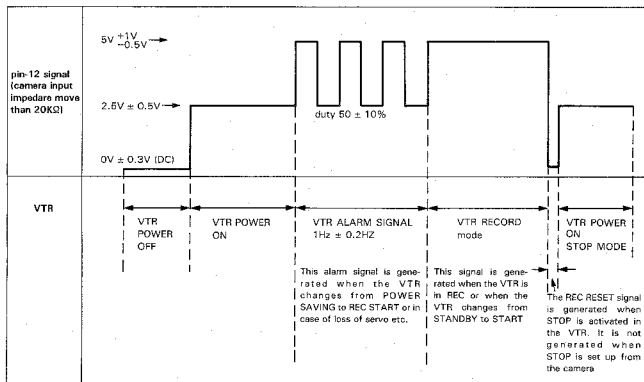
# **Note 1: Signal at Pin 10**

Battery voltage detection and warning signal generating circuits are located within the VTR. This signals are supplied from the VTR to the camera to either blink or light the LED at the bottom of the viewfinder.

BATTERY TERMINAL ADAPTOR (VTR INTERNAL BATTERY)	DC12V ~ 11.1V	DC11.1V ~ 10.8V	PIN 10 TURNS HIGH AT DC 10.8V. 10.6V DC or below the VTR Internal Power is cut off so that the Battery Power is sent to Pin 13.
PIN 10 OUTPUT FROM VTR	0V	1Hz $\pm$ 0.2Hz duty 50 $\pm$ 10% DC2 ~ 3V across 300 $\Omega$	
LED IN VIEWFINDER	NEITHER BLINKS NOR LIGHTS	BLINKS AT 1Hz	LIGHTS

# **Note 2: Signal at Pin 12**

When the VTR is ON the input to the camera at pin 15 is 2.5V DC. In VTR record mode the voltage is 5V DC. When servo is not applied or if alarm signals are generated within the VTR an alternating 1Hz signal (2.5 Vp-p with 2.5V DC as reference) is sent to the camera. At the tape end and when the VTR enters Stop mode or when setting up the Stop mode from the VTR, 0V DC is generated from 10 msec to 100 msec (called REC RESET). After REC RESET the signal level returns to 2.5V DC.



## VF (8P)



(WIRING SIDE)

Pin No.	SIGNAL	REMARK FOR SIGNAL
1	UNREG GND	GND for + 12V
2	REC/TALLY OUT	(Note 2)
3	(SPARE)	
4	VF VIDEO OUT (G)	
5	BATT IND. OUT	
6	VF VIDEO OUT (X)	1Vp-p
7	UNREG + 12V OUT	10.6V ~ 17V, 3A
8	(SPARE)	

## DC IN (4P)



(WIRING SIDE)

Pin No.	SIGNAL	REMARK FOR SIGNAL
1	UNREG GND	GND for + 12V
2	(SPARE)	
3	(SPARE)	
4	UNREG + 12V IN	10.6V ~ 17V, 3A

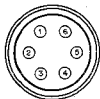
## MIC IN (3P)



(WIRING SIDE)

Pin No.	SIGNAL	REMARK FOR SIGNAL
1	MIC IN (G)	-60dBs, 600Ω
2	MIC IN (X)	
3	MIC IN (X)	

## LENS (6P)



(WIRING SIDE)

Pin No.	SIGNAL	REMARK FOR SIGNAL
1	VF VIDEO CONT IN	ON: 0 ± 0.5Vdc
2	VTR START/STOP IN	TRIG: 0 ± 0.5V
3	UNREG (GND)	GND for + 12Vdc
4	FORCED AUTO IRIS OUT	5 ± 0.5Vdc
5	IRIS CONT OUT	F16 : 3.4Vdc F2.8 : 6.2Vdc
6	UNREG (+12V) OUT	10.6 ~ 17Vdc, 3A

## 2-3-2. Connections

When cables with connectors are set to the respective connectors on the connector panel during installation or service, the specified or equivalent connectors with cables, or the specified cable assemblies should be used, these are listed as follows;

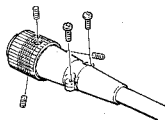
connector function	Parts No. and name of connector with cable
VIDEO OUT GEN LOCK (BNC)	1-560-069-11 PLUG, BNC or B-B cable assembly (Cable length 1.5m, optional)
VTR/CCU           (14P, MALE)	1-561-043-00 CONNECTOR, 14P, FEMALE 1-508-171-00 CONNECTOR, 10P, MALE (for CCQJ cable) 1-508-929-00 CONNECTOR, 14P, MALE (for CCQ cable) 1-560-110-00 CONNECTOR, 14P, MALE (for CCQK cable) or cable assembly • For 10P-VTR use CCQJ-2 (2m) • For 14P-VTR use CCQK-2 (2m) CCQ-2AR (2m) CCQ-10AR (10m) • For CCU use CCO-10AM (10m) CCO-25AM (25m) CCQ-60AM (50m) CCO-100AM (100m)
VF   (8P, FEMALE)	1-560-247-00 CONNECTOR, 8P, MALE or extension cable assembly (optional) VK-10D VK-50X
LENS (6P, FEMALE)	HR10-7PA-6PS PLUG, 6P, MALE
DC IN   (4P, MALE)	1-560-261-00 XLR-4P, FEMALE or cable assembly (optional) 1-551-969-00
MIC IN   (3P, FEMALE)	1-516-125-00 XLR-3P, MALE CANON XLR-3-12C equality
INTERCOM   (JACK)	1-557-339-00 PLUG, MINI (with sensor) or head set DR-100 (optional)

### 2-3-3. Removal of the CCQ connector

#### CCQ Connector (Removal of the connector)

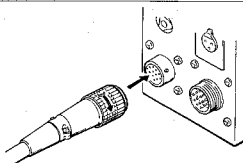
**Step 1.**

Remove the three hexagonal setscrews and the two  $\oplus$  setscrews.



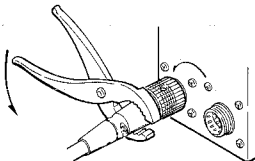
**Step 2.**

Fix the CCQ connector at the camera or VTR connector.



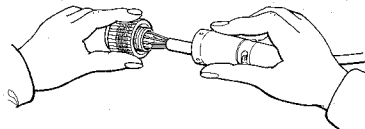
**Step 3.**

Rotate the CCQ connector to counterclockwise by the plier and loosen it.



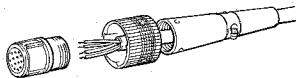
**Step 4.**

It can be removed by hand and unsolder

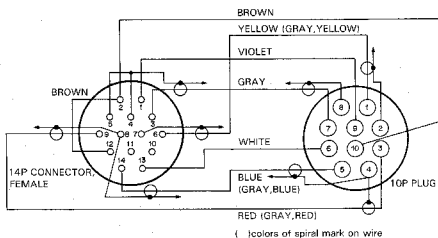


**Step 5.**

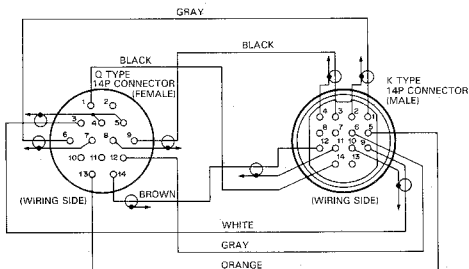
It can be broken up as shown in Figure.



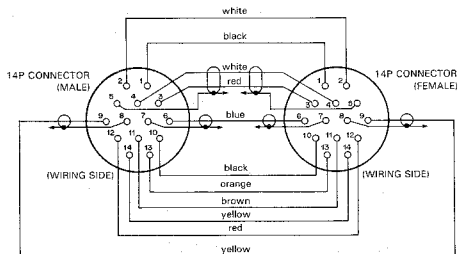
CCQJ cable (Wiring diagram)



CCQK cable (Wiring diagram)



CCQ cable (Wiring diagram)





## 2-4. SIMPLE ALIGNMENT

### PS-15

#### BEAM (RV1, RV18 & RV23)

Control the beam amount of the channels by setting the G1 electrode voltage. Set the [ABO] controls on the PS-15 board to the counter-clockwise fully. Shoot the gray scale chart, and adjust the RVs so that the waveforms at the input terminals (Pins 27, 23 and 25 of extension board) on the PS-15 board are not clipped to 1.0 Vp-p.

**ABO** BLACK CLIP (RV5, RV14 & RV19)  
ABO GAIN (RV11, RV16 & RV21)  
KNEE POINT (RV12, RV17 & RV22)  
KNEE SLOPE (RV24, RV7 & RV9)  
WHITE CLIP (RV10, RV15 & RV20)

Prevent a beam shortage of the pickup tube and oscillation when the iris is opened for 8 times of the normal video output level.

PS-15 Board (Component side)

	GREEN	RED	BLUE
Normal video level	8 times	0.4 V	
Adjust point	3.0 V	2.6 V	
	TP8	TP8	TP7

### PS-26

#### E. FOCUS (RV1 through RV3)

Control the beam focusing of the channels by setting the focusing coil current. Shoot the multi-burst chart and adjust the RVs so that the signal voltage amplitude is at 5 MHz is maximized.



PS-26 Board (Component side)

### AT-31

#### IRIS SET (RV2) IRIS MODE (RV1)

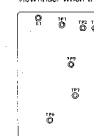
Adjust the detection method of the video level and the sensitivity for the signal when the lens iris is set to "AUTO". The peak level detection is selected when the IRIS MODE is at the fully counter-clockwise position and the average level detection is selected at its fully clockwise position. Set the RV1 to the mid position, shoot the gray scale chart and adjust the RV2 so that the white portion of the gray scale chart is 700mVp-p.

#### ABL (RV5)

Control the black level of the composite video signal. Shoot the gray scale chart, and adjust the RV5 so that the black portion of the gray scale chart does not change when selecting the ABL switch from ON to OFF or vice versa.

#### LOW LIGHT (RV3)

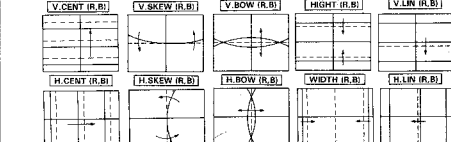
Control the average detection level of the IRIS MODE. Shoot the gray scale chart, and adjust the RV3 so that the "LOW LIGHT" is indicated in the viewfinder when the white level is 280mVp-p by using lens iris.



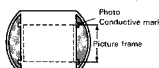
AT-31 Board (Component side)

### DF-20

#### Registration adjustment



**H MASTER (CENT SIZE)** (RV1 & RV3)  
**V MASTER (CENT SIZE)** (RV4 & RV6)  
Adjust the picture frame of the G channel.



#### Shading adjustment

**H SAW** (RV16 through RV18)  
**H PARA** (RV23 through RV25)  
**V SAW** (RV20 through RV22)  
**V PARA** (RV27 through RV29)

Adjust the black level shading of the channels so that the video signal waveform are as flat as possible. Prior to the adjustment, set the GAIN switch to +18dB.

**BLACK SET** (RV40 through RV42)  
Function so that the pedestals of the channels do not vary even when the GAIN switch are switched from 0 dB to 18 dB or vice versa.

DF-20 Board (Component side)

### PR-61

#### LEVEL (RV1, RV5 & RV11)

Shoot the gray scale chart, adjust the video levels of the channels as follows:

Level	GREEN	RED	BLUE
Test iris	400mVp-p (at TP1)	TP11	TP10
Adjust point	TP2	TP11	TP10
Spec	800mVp-p	270mVp-p	

#### SUB GAIN (R&B) (RV12 & RV6)

Control the video level for the preset mode. Shoot the gray scale chart, and adjust RVs so that the carrier leakage in the white portion is minimized.

#### WHITE CLIP (RV17 through RV19)

Control the white clip of the channels. Shoot the gray scale chart, adjust the white clip of G channel to 800mV at monitor out by using RV17 and then minimize the carrier leakage in the white portion in the composite video signal output by using RV18 and RV19.

### PED (RV2, RV7 & RV13)

Control the pedestal level of the channels. Shoot the gray scale chart, adjust the pedestal level of G channel to 40mV at monitor out by using RV2 and then minimize the carrier leakage in the pedestal at the composite video signal output by using RV7 and RV13.

#### Gamma adjustment

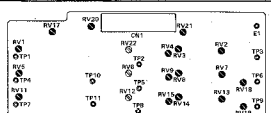
Adjust the gamma curves of the channels so that the video signal waveform of each channel is the linear stage staircase waveform when the logarithmic gray scale chart is shot.

#### GAMMA BAL (RV3, RV6 & RV14)

When RV4 is turned on fully clockwise and counter-clockwise, adjust RV3 so that the white level is stable. Then, adjust RV6 and RV14 alternately and repeatedly two or three times so that the carrier leakage in the 11-step of gray scale waveform signal is minimized.

#### GAMMA ADJ (RV4, RV9 & RV15)

When the white level is 700mV, gamma correction intersecting point is 385mV at G channel by using RV4, and then adjust RV9 and RV15 so that the carrier leakage in the 3 to 4 steps of gray scale waveform signal is minimized.



PR-61 Board (Component side)

#### BARS LEVEL (RV21)

Control the BARS level of the channels. Adjust RV21 so that the BARS level is 1.4Vp-p at TP3.

#### BARS WIDTH (RV20)

Control the BARS width of the channels. Adjust RV20 so that the black portion of color bar is 3.5µs.

### EN-28A

#### SNUT (RV15)

Control the I and Q phase of the bars signal. Adjust the ratio of I and Q signal width to the color-bar size within a horizontal trace time to 5:4 using RV14.

#### COLOR BAR (RV5, RV8 & RV16)

- Adjust the gray signal level at 540mV using RV8.
- Adjust the white peak level at 700mV using RV16.
- Adjust the synchronizing signal level at 300mV using RV5.

#### BLACK BAL (I,Q) (RV2 & RV4)

Adjust RV2 and RV4 alternately and observe the output video signal corresponding to the black portion. The adjustment should be minimized the carrier leakage.

#### BURST LEVEL (RV19)

#### CHROMA LEVEL, G (V) GAIN (RV11, RV1 & LV11)

Control the chroma phase and level. Adjust RV9 so that the 75% scale marker position using RV19. Adjust RV11, RV1 and LV11 alternately so that the chroma spots are located within the specified area on the vectorscope.

#### ZEBRA (RV9)

Adjust RV9 so that the 500mV section is displayed on the viewfinder screen as a zebra pattern when the ZEBRA ON/OFF switch turns on.

#### INT SC PHASE (RV14)

Adjust the sub-carrier phase of the output video signal.

#### EXT SC PHASE (RV13)

RV13 and S2 adjust the sub-carrier phase of the output video signal at lock and the adjustable range is 360 degrees.

#### H PHASE (RV12)

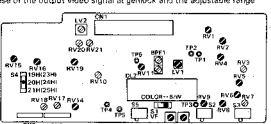
RV12 adjusts the horizontal phase of the output video signal at lock.

#### V BLK G WIDTH (S4)

S4 adjusts the V BLK G width at 19H, 20H or 21H.

#### VF (S1)

S1 changes the B/W or COLOR on the viewfinder screen.



**EL** (RV1, RV5 & RV11)

out the gray scale chart, adjust the video levels of the channels as follows:

	GREEN	RED	BLUE
1/16	400mVp-p (At TP1)		
Unit point	TP2	TP11	TP10
S	800mVp-p	270mVp-p	

**FE GAIN (R&B)** (RV12 & RV6)

Control the video level for the preset mode. Shoot the gray scale chart, and adjust RVs so that the carrier leakage in the white portion is minimized.

**FE CLIP** (RV17 through RV19)

Control the white clips of the channels. Shoot the gray scale chart, adjust the white clip of G channel to 800mV at monitor out using RV17 and then minimize the carrier leakage in the white portion at the composite video signal output by using RV18 and RV19.

**PED** (RV2, RV7 & RV13)

Control the pedestal level of the channels. Shoot the gray scale chart, adjust the pedestal level of G channel to 400mV at monitor out by using RV2 and then minimize the carrier leakage in the pedestal at the composite video signal output by using RV7 and RV13.

**Gamma adjustment**

Adjust the gamma curves of the channels so that the video signal waveform of each channel is the least change staircase waveform when the logarithmic gray scale chart is shot.

**GAMMA BAL** (RV3, RV8 & RV14)

When RV4 is turned on fully clockwise and counterclockwise, adjust RV3 so that the white level is stable. Then, adjust RV8 and RV14 alternately and repeatedly two or three times so that the carrier leakage in the 11-stop of gray scale waveform signal is minimized.

**GAMMA ADJ** (RV4, RV9 & RV15)

When the white level is 700mV, gamma correction intersecting point is 395mV at G channel by using RV4, and then adjust RV9 and RV15 so that the carrier leakage in the 3 to 4 steps of gray scale waveform signal is minimized.



PR-61 Board (Component side)

**BARS LEVEL** (RV21)

Control the BARS level of the channels. Adjust RV21 so that the BARS level is 1.4Vp-p at TP3.

**BARS WIDTH** (RV20)

Control the BARS width of the channels. Adjust RV20 so that the black portion of color bar is 3.5µm.

**EN-28A****BLUR** (RV15)

Control the I and Q phase of the bars signal. Adjust the ratio of I and Q signal width to the color-bar size within a horizontal trace time to 5:4 using RV14.

**COLOR BAR** (RV5, RV8 & RV16)

- Adjust the gray signal level at 540mV using RV8.
- Adjust the white peak level at 700mV using RV16.
- Adjust the synchronizing tip level at 300mV using RV5.

**BLACK BAL (L&I)** (RV2 & RV4)

Adjust RV2 and RV4 alternately and observe the output video signal corresponding to the black portion. The adjustment should be minimized the carrier leakage.

**BURST LEVEL** (RV19)**CHROMA LEVEL, Q [V] GAIN** (RV11, RV1 & LV1)

Control the chroma phase and level.

Adjust the burst level at 75% scale marker position using RV19. Adjust RV1, RV11 and LV1 alternately so that the chroma spots are located within the specified area on the vectorscope.

**ZEBRA** (RV9)

Adjust RV9 so that the 500mV section is displayed on the viewfinder screen is a zebra pattern when the ZEBRA ON/OFF switch turns on.

**INT SC PHASE** (RV14)

Adjust the sub-carrier phase of the output video signal.

**EXT SC PHASE** (RV13)

RV13 and S2 adjust the sub-carrier phase of the output video signal at genlock and the adjustable range is 360 degrees.

**H PHASE** (RV12)

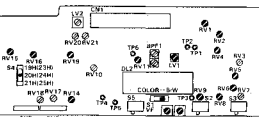
RV12 adjusts the horizontal phase of the output video signal at genlock.

**V BLKG WIDTH** (S4)

S4 adjusts the V BLKG width at 19H, 20H or 21H.

**VF** (S1)

S1 changes the B/W or COLOR on the viewfinder screen.



EN-28A Board (Component side)

**IE-7****DTL** (RV7)

Adjust the level of the detail signal superimposed on the output video signal.

**NOISE** (RV9)

Adjust the level for selecting the noise component in the detail signal so that the noise of overall video signal reduces.

**HLV RATIO** (RV5)

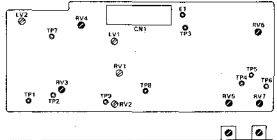
Adjust the balance of the horizontal and vertical of the detail signals.

**APC** Automatic Phase Control (RV4)

Control the phase of G channel signal. Shoot the gray scale chart, adjust the ratio of the white level to the reference pulse in the synchronizing signal time to 3:1 at TP1 using RV4.

**AGC** Automatic Gain Control (RV3)

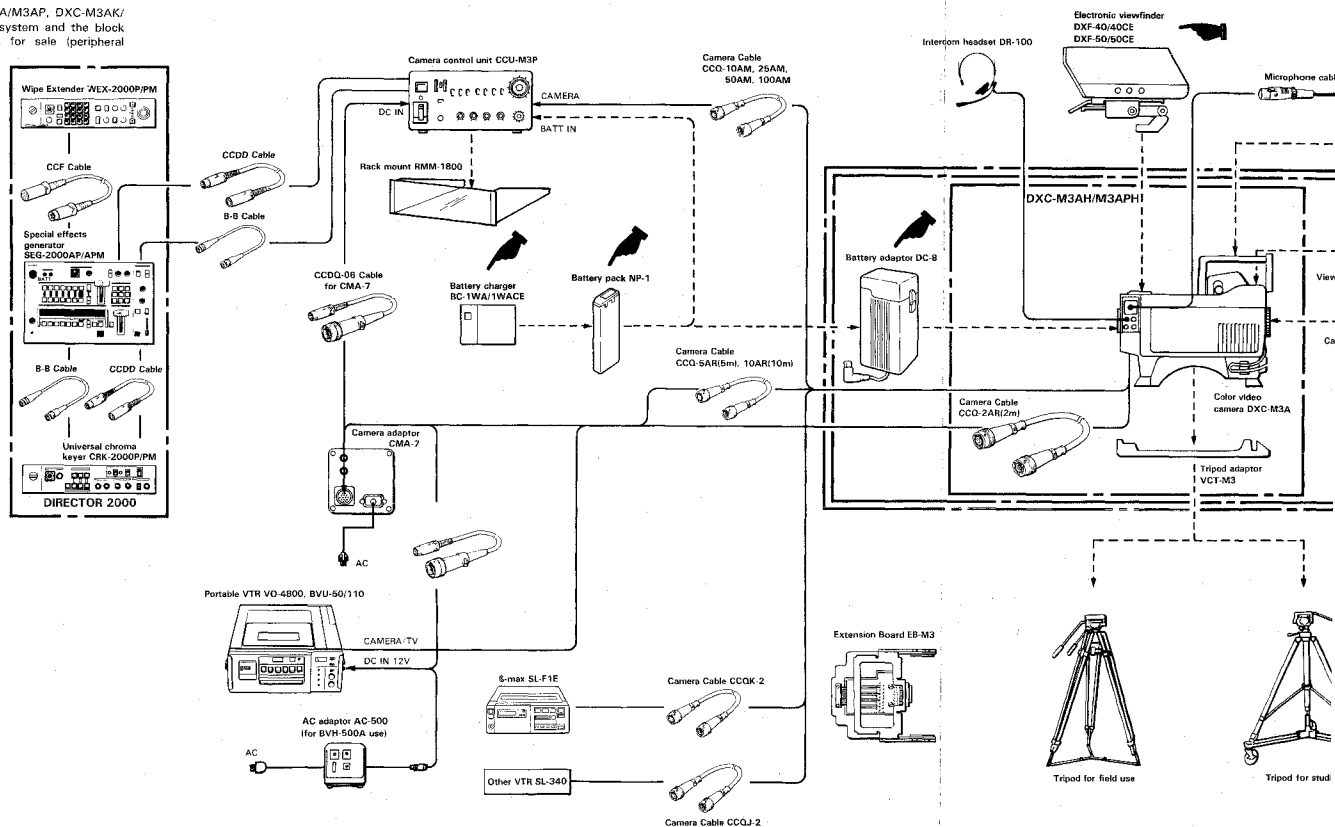
Control the gain of G channel signal. Shoot the gray scale chart, adjust the white level at TP2 to 0.6 Vp-p using RV3.

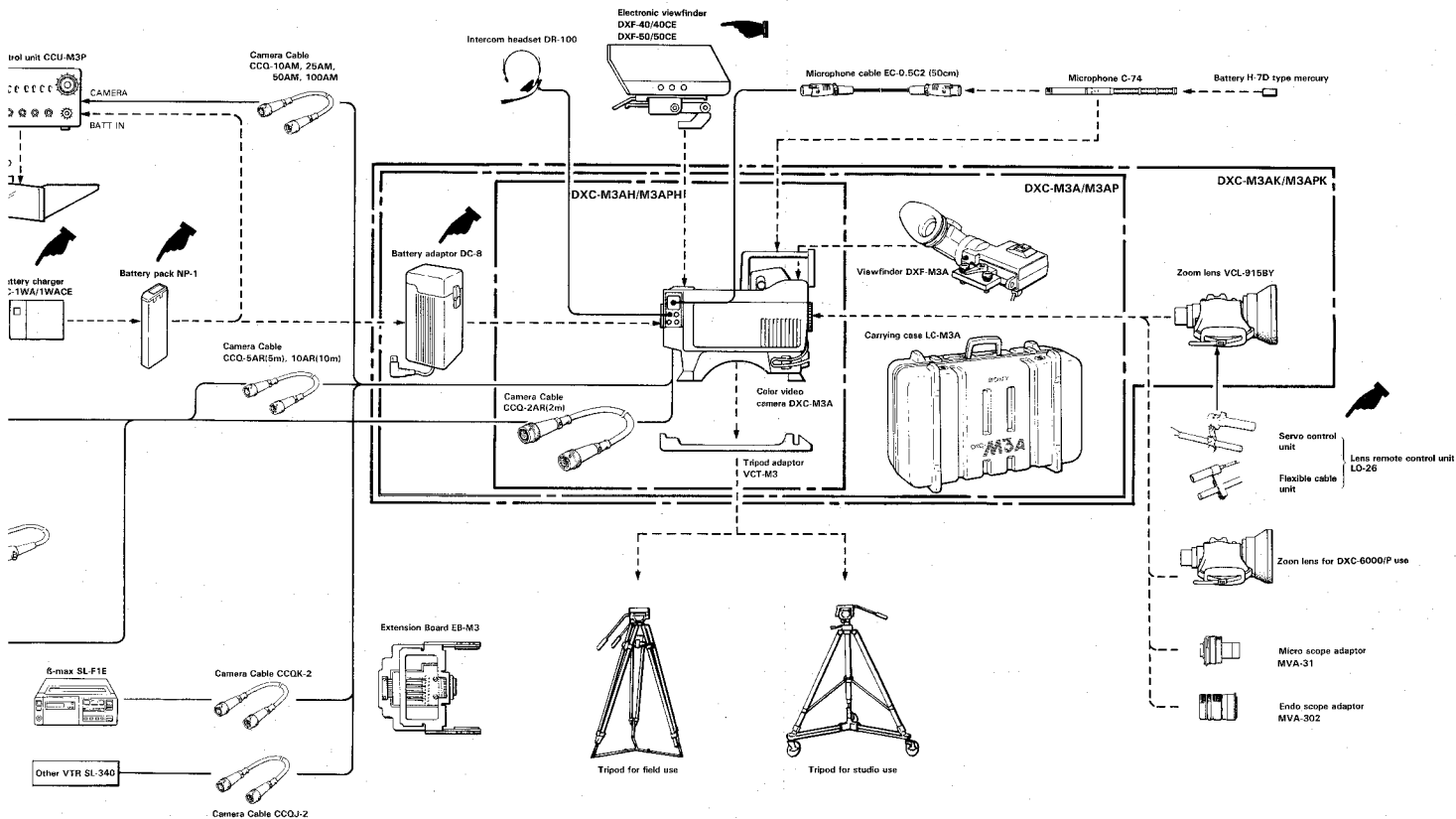


IE-7 Board (Component side)

## 2-5. SYSTEM BLOCK DIAGRAM

The configuration of the DXC-M3A/M3AP, DXC-M3AK/M3APK and DXC-M3AH/M3APH system and the block diagram of separate accessories for sale (peripheral devices) are shown.





## 2-6. SELF-CHECK FUNCTION FOR AUTO-CONTROL SYSTEM

### 2-6-1. Indications and Meanings of the Term NG in the Auto-Centering Operation

View-finder screen	Meanings
<div data-bbox="174 368 372 513" style="border: 1px solid black; padding: 10px; text-align: center;">           CENT: NG : OBJECT? n TRY AGAIN         </div>	<p>Meanings of indications:</p> <ul style="list-style-type: none"> <li>•n=00 ➡ The number of horizontal gate pulses are 255 or less in one horizontal time period.</li> <li>•n=01 ➡ The number of vertical gate pulses are 15 or less in one vertical time period.</li> <li>•n=02 ➡ The number of cross-points in the signal waveform are two or more while the multiburst chart is taken.</li> </ul> <p>Note: If the number of horizontal gate pulses are 255 or less and the number of vertical gate pulses are 15 or less, the indication is n=01.</p>
<div data-bbox="174 662 372 808" style="border: 1px solid black; padding: 10px; text-align: center;">           CENT: NG : CIRCUIT NG? DET n TRY AGAIN         </div>	<p>Preparation: Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Meanings of indications:</p> <ul style="list-style-type: none"> <li>•n=00 ➡ The error voltage of R-G or B-G is less than 1 and then the control data bit is shifted by +1 or -1 depending on the error voltage polarity, but the polarity of the error voltage is not inverted. ex. The sample and hold circuit does not work.</li> <li>•n≠1 ➡ The gate pulse counter always overflows. (Normally this counter is reset after it counts 16 gate pulses. In this condition it does not reset.) ex. The gate pulse counter does not work.</li> </ul> <p>Note: After completing this check, remove the jumper wire connection TP8/AT-31 board to E1/AT-31 board.</p>
<div data-bbox="174 953 372 1099" style="border: 1px solid black; padding: 10px; text-align: center;">           CENT: NG : OBJECT? n TRY AGAIN         </div>	<p>Meaning of indications:</p> <ul style="list-style-type: none"> <li>•n=10 ➡ B-H CENT: NG</li> <li>•n=11 ➡ B-V CENT: NG</li> <li>•n=12 ➡ B-H CENT: NG</li> <li>•n=15 ➡ B-H CENT: NG</li> </ul> <p>i) Even if the control data are changed, the error voltage of R-G or B-G does not change. ex. Malfunction in the control system, or the centering control signal path is open.</p> <p>ii) The error is out-of-range of the auto-centering control.</p> <p>iii) A highly saturated color in the object at which aim is being.</p>

## 2-6-2. Indications and Meanings of the Term NG in the Auto-White Balance Operation

View-finder screen	Meanings
<div style="border: 1px solid black; padding: 10px; text-align: center;"> WHT: NG : LOW LIGHT TRY AGAIN </div>	<p>Cause: The auto-white balance operation under LOW LIGHT conditions.</p>
<div style="border: 1px solid black; padding: 10px; text-align: center;"> WHT: NG : CIRCUIT NG? DET n TRY AGAIN </div>	<p>Preparation: Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Meanings of indications:</p> <ul style="list-style-type: none"> <li>• <math>n=00 \Rightarrow</math> R gain control system</li> <li>• <math>n=\phi 1 \Rightarrow</math> B gain control system</li> </ul> <p>Effect: The polarity of the error voltage of R-G or B-G is not inverted even though the control data is shifted by +1 or -1 when the error voltage is within <math>\pm 1</math> bit. ex. The sample and hold circuit does not work and the error voltage of R-G or of B-G is always 0V.</p> <p>Note: After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>
<div style="border: 1px solid black; padding: 10px; text-align: center;"> WHT: NG : CIRCUIT NG? CTL n TRY AGAIN </div>	<p>Preparation: Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Meanings of indications:</p> <ul style="list-style-type: none"> <li>• <math>n=\phi \phi \Rightarrow</math> R gain control system</li> <li>• <math>n=\phi 1 \Rightarrow</math> B gain control system</li> </ul> <p>Effect: The error voltage of R-G or B-G does not change even though the control voltage is changed when the error voltage is not within <math>\pm 1</math> bit. ex. Malfunction in the R-ch or B-ch gain control system.</p> <p>Note: After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>

<div data-bbox="174 298 372 444"> <p>WHT: NG : C. TEMP. LOW CHG. FILTER TRY AGAIN</p> </div> <div data-bbox="174 468 372 614"> <p>WHT: NG : C. TEMP. HI CHG. FILTER TRY AGAIN</p> </div>	<p>Effect : The control data do not settle down to a value between <math>\phi\phi</math> and FF even though the error voltage of R-G or B-G changes with a deviation in the control voltage.</p>
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### 2-6-3. Indications and Meanings of the Term NG in the Auto-Black Balance Operation

View-finder screen	Meanings
<div data-bbox="174 808 372 953"> <p>BLK: NG : LENS CLOSE? TRY AGAIN</p> </div>	<p>Effect : The video level on G-ch does not fall. Cause :  <ul style="list-style-type: none"> <li>•The lense connector is disconnected.</li> <li>•The iris close mechanism for the lense does not work.</li> </ul> </p>
<div data-bbox="174 1055 372 1201"> <p>BLK: NG : CIRCUIT NG? DET 01 TRY AGAIN</p> </div>	<p>Preparation : Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Effect : The difference of the black level is not changed by the corrective control data when the gain difference of the black level is in the range 0 dB to 18 dB.</p> <p>Causes : Malfunction in the sample and hold system.</p> <p>Note : After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>

BLK: NG  
: CIRCUIT NG?  
DET n  
TRY AGAIN

**Preparation:**

Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.

**Meanings of indications:**

- n=08 → R-ch pedestal system
- n=09 → B-ch pedestal system

**Effect:** The polarity of the error voltage of R-G or B-G is not inverted even though the control voltage is changed when the error voltage is within  $\pm 1$  bit.

**Cause:** The sample and hold circuit does not work etc.

**Note:** After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.

BLK: NG  
: CIRCUIT NG?  
CTL n  
TRY AGAIN

**Preparation:**

Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.

**Meanings of indications:**

- n=#2 → R-ch
- n=#3 → B-ch
- n=#6 → G-ch

Out-of-range of AUTO BLACK SET  
(Malfunction in the control system)

- n=#8 → R-ch
- n=#9 → B-ch

Out-of-range of AUTO BLACK  
BALANCE  
(Malfunction in the control system)

**Note:** After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.



## SECTION 3 REPLACEMENT OF MAIN PARTS

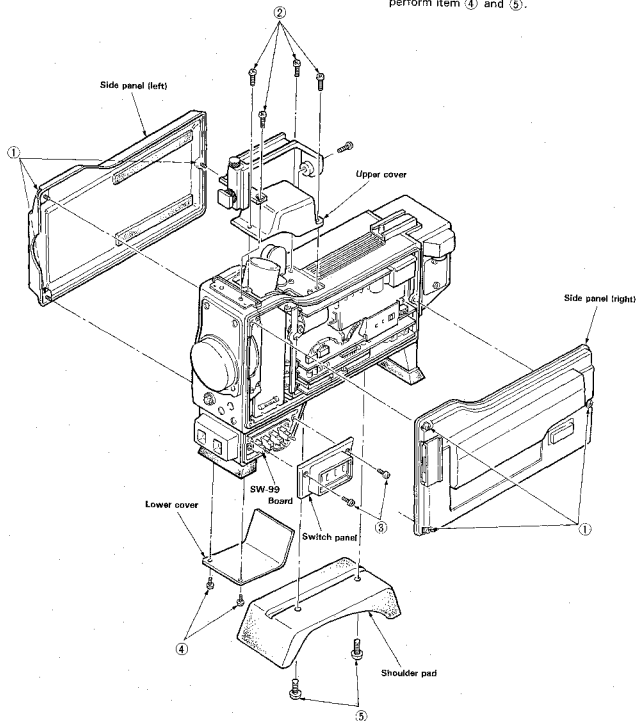
### 3-1. DISASSEMBLY

#### 3-1-1. Disassembly of Side Panels, Shoulder Pad

1. Remove the six screws (B3 x 8) ① and remove the side panels.
2. Remove the three screws (B3 x 6) ② and remove the upper cover.
3. Remove the two screws (B3 x 6) ③ and remove the switch panel, further remove the two screws (PSW3 x 4) and can be removed the SW-99 board.
4. Remove the two screws (B3 x 6) ④ and remove the lower cover.
5. Remove the two screws (B4 x 14) ⑤ and remove the shoulder pad.

**Note:**

- Perform only item ① and ② before adjustment.
- When the tube of red channel is replaced only, perform item ④ and ⑤.

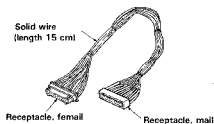


### 3-1-2. Removal of AT-31 Board

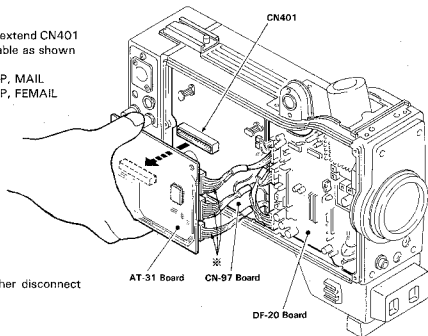
1. Pull out the AT-31 board in the direction indicated of arrow.

**Note:** When be replaced the AT-31 board, extend CN401 connector. But make a extension cable as shown below.

- 1-564-267-00 RECEPTACLE, 36P, MAIL
- 1-562-308-00 RECEPTACLE, 36P, FEMAIL

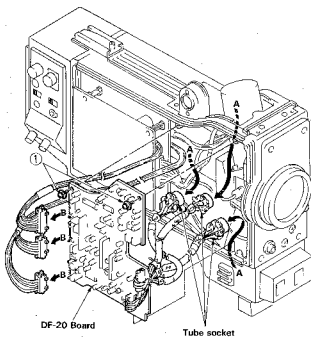


2. When changing the AT-31 board, further disconnect the three connectors (※ mark).



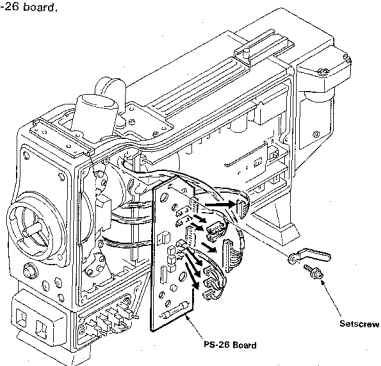
### 3-1-3. Removal of DF-20 Board

1. Remove the two screws ①.
2. When replacing the pick-up tube, disconnect the socket of tube in the direction of the arrow "A".
3. When replacing the DF-20 board, disconnect the three connectors in the direction of the arrow "B".



### 3-1-4. Removal of PS-26 Board

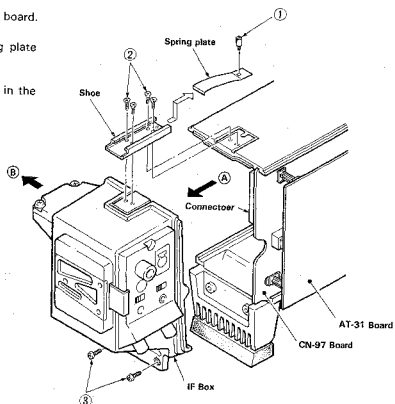
1. Remove a setscrew.
2. Disconnect seven connectors in the direction indicated of the arrow from PS-26 board.



### 3-1-5. Disassembly of IF Box

**Note:** Remove the PS-26, EN-28A, PR-61 and IE-7 board.

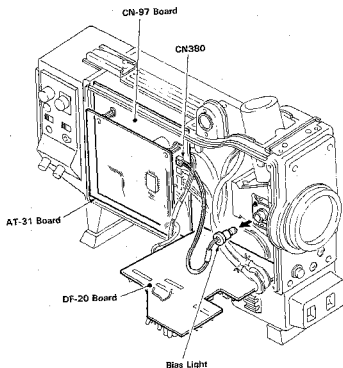
1. Remove a setscrew ① and remove the spring plate from shoe in the direction of the arrow.
2. Remove four screws ② and remove the shoe.
3. Remove two screws ③ and remove the IF box in the direction indicated of the arrow (B) → (A).



## 3-2. REPLACEMENT OF MAIN PARTS

### 3-2-1. Replacement of Bias Light

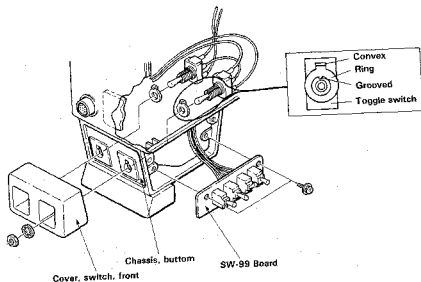
1. Remove two setscrews ① and lay down the DF-20 board as shown in the figure.
2. Pull out the bias light in the direction of arrow and disconnect CN380 connector from the CN-97 board.



### 3-2-2. Replacement of AUTO W/B BAL and AUTO CENT switch

1. Remove the side panel (right), switch panel and SW-99 board referring to page 3-1.
2. Remove a hexagonal with a nut driver.

**Note:** When mounting the hexagonal nut, match the mounting ring pawl with the notched hole of the bottom chassis while matching the toggle switch grooved section and the mounting ring convex section.

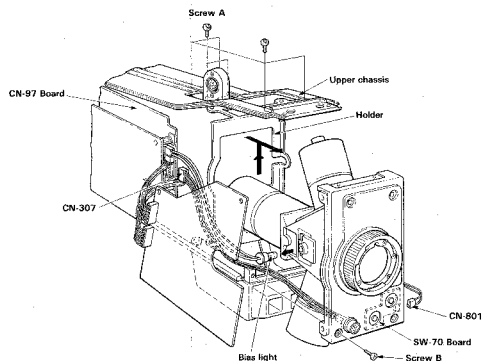


### 3-2-3. Replacement of Optical Prism Block

1. Remove the side panel, upper cover and lower cover referring to page 3-1.
2. Remove the PS-15 board and EN-28A board.
3. Remove the DF-20 board and PS-26 board referring to page 3-2.

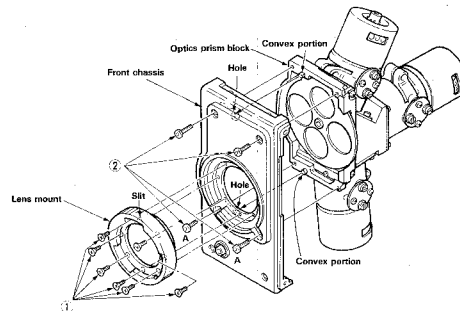


#### ① Removal of optics prism block



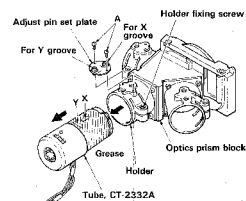
1. Remove the tube socket from the MF Station tube.
  2. Remove the shoe referring to page 3-3 and remove four screws A.
  3. Disconnect the CN307 connector from the CN-97 board.
- Note:** When mounting, match the upper chassis and the IF box and further match the three recessed sections on the rear side of the upper chassis and CN-97 board.
3. Disconnect the CN801 connector from the SW-70 board.
- Remove two screws B and remove the optics prism block in the direction indicated of the arrow.

#### ② Removal of Lens mount and front chassis



1. Remove six screws ① and remove the lens mount.  
**Note:** When mounting, set the lens mount so that the cut end of the lens mount is on top.
2. Remove four screws ② and remove the front chassis.  
**Note:** When mounting, match the hole position of the front chassis and the convex section of the optics prism block. In addition, use short screws (+ K3 x 8) as two lens mount screws (A).

#### ③ Removal of Pick-up tube

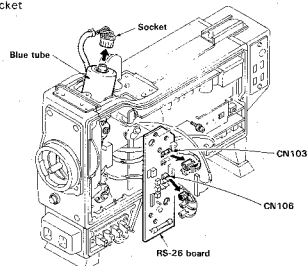


1. Loosen a holder fixing screw about one turn.
2. Remove two fixing screws A securing the Adjust Pin Set Plate and remove the Adjust Pin Set Plate from the Holder.
3. Pull out the tube from the Holder gently.
4. Clean the inner part of the holder and the shaded portion of the pick-up tube using cleaning paper.
5. Apply a thin coat of grease (rozoid grease) on the shaded portion of the pick-up tube.  
**Note:** Avoid getting any grease on the flexible substrate.
6. Insert the tube to the Holder.
7. Insert the Adjust Pin into the grooves, through X and Y, of the Holder, and be sure that the tube moves smoothly to the following arrow direction by turning the adjust pins.

### 3-2-4. Replacement of Pick-up tube

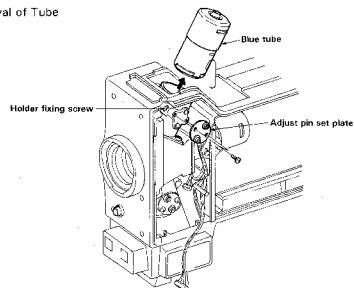
#### [BLUE Tube]

##### ① Removal of Socket



1. Remove the upper cover referring to page 3-1.
2. Remove a socket in the direction of the arrow.
3. Disconnect CN103 and CN106 connectors from the PS-26 board and remove a fixing screw securing PS-26 board.

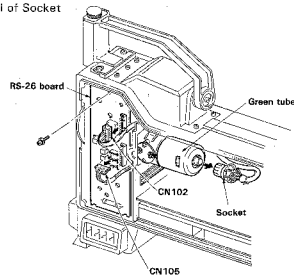
##### ② Removal of Tube



1. Loosen a fixing screw securing the Holder.
2. Remove two fixing screws securing the Adjust Pin Set Plate and remove the Adjust Pin Set Plate from the Holder.
3. Pull out the tube in the direction of the arrow gently.

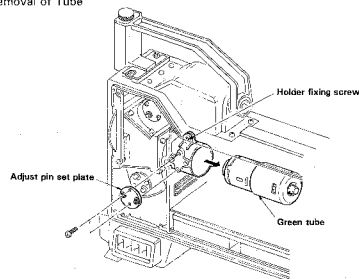
#### [GREEN Tube]

##### ① Removal of Socket



1. Remove the side panel referring to page 3-1, and remove the PS-15 and EN-28A board.
2. Remove a socket in the direction of the arrow.
3. Disconnect CN102 and CN105 connectors from the PS-26 board and remove a fixing screw securing PS-26 board.

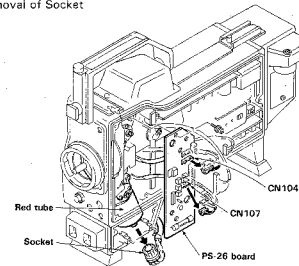
##### ② Removal of Tube



1. Loosen a fixing screw securing the Holder.
2. Remove two fixing screws securing the Adjust Pin Set Plate and remove the Adjust Pin Set Plate from the Holder.
3. Pull out the tube in the direction of the arrow gently.

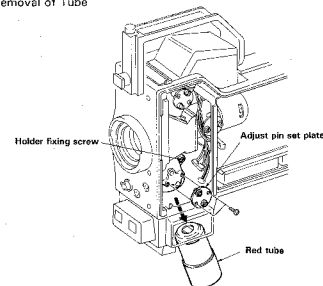
#### [RED Tube]

##### ① Removal of Socket



1. Remove the Shoulder pad and Lower cover referring to page 3-1.
2. Remove a socket in the direction of the arrow.
3. Disconnect CN104 and CN107 connectors from the PS-26 board and remove a fixing screw securing PS-26 board.

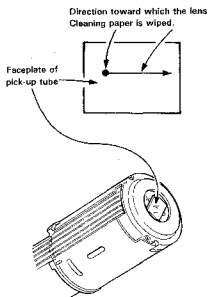
##### ② Removal of Tube



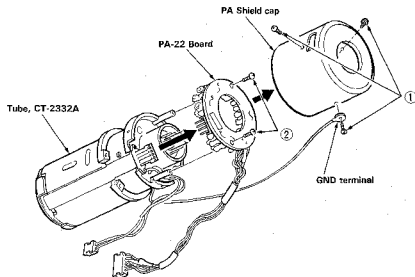
1. Loosen a fixing screw securing the Holder.
2. Remove two fixing screws securing the Adjust Pin Set Plate and remove the Adjust Pin Set Plate from the Holder.
3. Pull out the tube in the direction of the arrow gently.

#### 4 How to clean the faceplate of pick-up tube

1. MF Saticon tube : CT-2332A  
(Sony part No.8-701-023-38)
2. Preparatory material : Lens cleaning paper, ether, and ethylalcohol.
3. Cleaning solution : Prepare cleaning solution by mixing 70% of ether and 30% of ethylalcohol.
4. Clean the faceplate of a pick-up tube helically as shown in the figure with the lens cleaning paper containing the cleaning solvent on top of the folded portion so as to remove dust or stains from the faceplate.  
Helically wipe out dust from the faceplate with the lens cleaning paper. Do not let the cleaning solvent stain the faceplate after cleaning it.



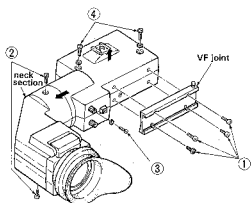
#### 5 Removal of Pre-amplifier (PA-22 Board)



1. Remove the three screws ① and remove the PA shield cap.
2. Remove the two screws ② and remove the PA-22 board.

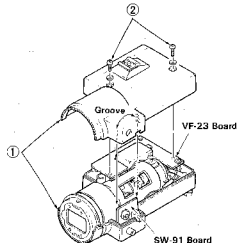
### 3-3. REPLACEMENT OF ELECTRONIC VIEWFINDER CRT

#### ① Removal of Outer Cabinet



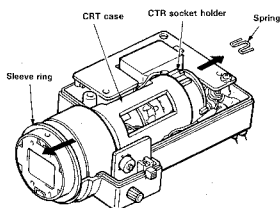
1. Remove the four screws ① and remove the VF joint.
2. Remove the two screws ② and remove the neck section in the direction of the arrow.
3. Remove a fixing screw securing the knob ③ and remove the knob.
4. Remove the two screws ④ and remove the upper case in the direction of the arrow.

#### ② Installation of Upper case



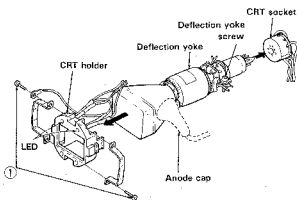
1. Add the groove of upper cover to SW-91 board so that the upper cover can be installed ① and tight the two screws ②

#### ② Removal of CRT (1)



1. Pull the spring in the direction of the arrow.
2. Remove the CRT case assembly by spreading the CRT socket holder.
3. Pull the sleeve ring in the direction of the arrow and the CRT case assembly can be branched off into two.

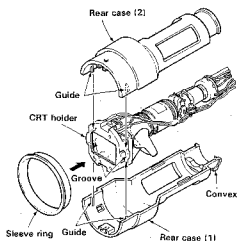
#### ③ Removal of CRT (2)



1. Remove the two screws ① and remove the CRT band so that the CRT holder can be removed.
2. Remove the CRT socket and anode cap.
3. Loosen the deflection yoke screw and pull the CRT off of the deflection yoke.



## ⑥ Mounting of CRT (3)



1. After adding the guide of the rear case (1) to the groove portion of the CRT holder, install them.

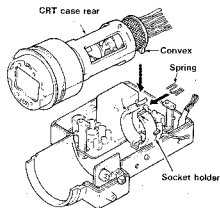
**Note:**

- The anode lead should be below of the CRT.
- The convex in the CRT rear case (1) is as shown in the figure.

2. Install the CRT rear case (2) to the CRT rear case (1).

**Note:** Be especially careful of the CRT wiring.

3. Insert the sleeve ring to the CRT rear case in the direction of the arrow.

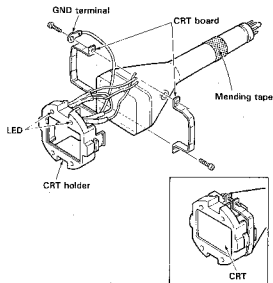


4. Coat the grease at the shaded portion of the CRT case rear.

5. Insert the CRT case rear to the CRT socket holder under the convex of CRT case rear.

6. Insert the spring in the direction of the arrow as shown in the figure.

## ④ Mounting of CRT (1)

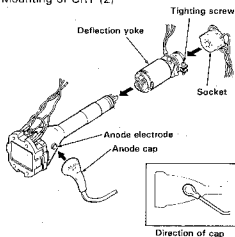


1. Wrap mending tape around the DY tightening section of the CRT.

2. Insert the CRT holder and CRT band as shown in the figure.

**Note:** Be sure that a space of the CRT band is about 4 mm.

## ⑤ Mounting of CRT (2)



1. Insert the deflection yoke and tight the tightening screw.

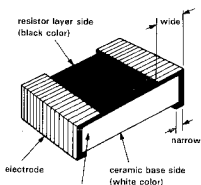
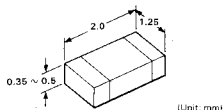
2. Attach the anode cap to the CRT as shown in the figure.

### 3-4. CHIP COMPONENTS

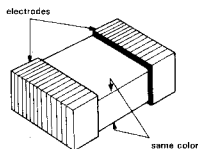
#### 3-4-1. Chip components

Chip components include resistors, capacitors, transistors, diodes, coil and adjustable resistors. In this section, the 2125-type of resistors, ceramic capacitors, transistors and diodes which are used most frequently will be described.

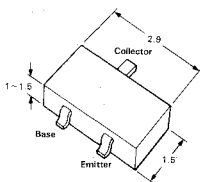
#### Identification



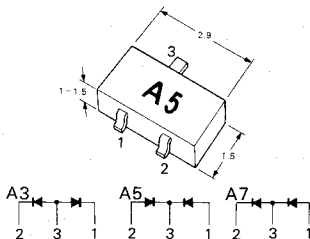
Resistor



Laminated Ceramic Capacitor



Transistor



Diode

### 3-4-2. Replacement of Chip components

All chip components should be connected and disconnected, using a tapered soldering iron (temperature of the iron tip ; less than 280°C (536°F)), a pair of tweezers and braided wire.

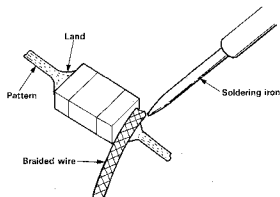
#### Precaution for replacement

1. Do not disconnect the chip component forcefully. Otherwise, the pattern may peel off.
2. Never re-use a disconnected chip component. Dispose of all old chip components.
3. To protect the chip component, heating time for attaching the component should be within 3 seconds.

#### Removal of Chip components

##### (1) Removing solder at electrode

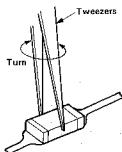
Remove the solder at the electrode, using a thin braided wire. Do not remove the solder of the part (chip component) attached adjacent to the electrode.



##### (2) Disconnecting chip components

Turn the tweezers with the soldering iron alternately applied to both electrodes, and the chip component will be disconnected.

Take careful precautions while disconnecting, because if the chip component is forcefully removed the land may peel off. Never re-use a disconnected chip component.



##### (3) Smoothing the solder surface

After disconnecting the chip component, remove the solder by using a braided wire to smooth the land surface.

#### Installation of Chip components

The value of chip components is not displayed on the main body. Take due precautions to avoid mixing new chip components with other ones.

##### (1) Applying solder to land on one side.

Apply a thin layer of solder to the land on one side where the chip component is to be connected. Too much solder may cause bridging.

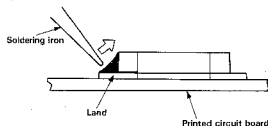
Small quantity of solder



##### (2) Speedy soldering

Hold the chip component at the desired position, using tweezers, and apply the soldering iron in the arrow-marked direction.

To protect the chip component, heating time should be within 3 seconds.



##### (3) Speedy soldering of electrode on the other side

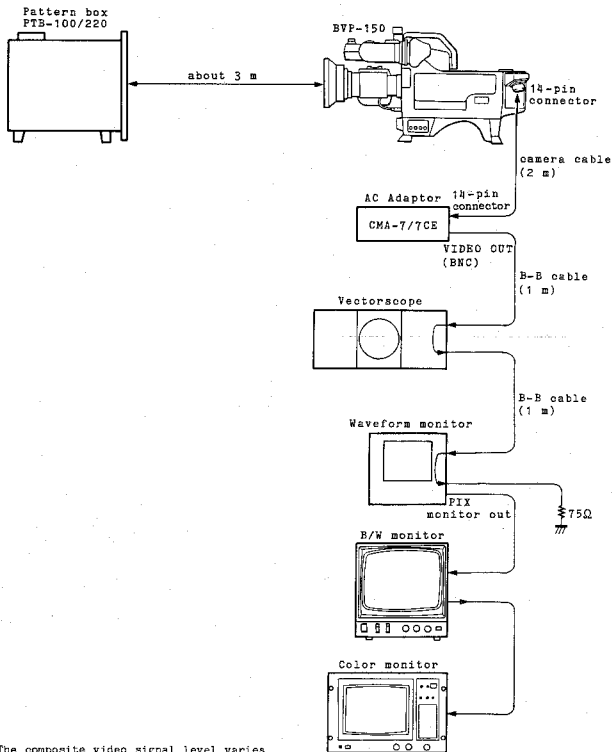
Solder the electrode on the other side in the same way as in (2) above.



## SECTION 4 ALIGNMENT

### 4-1. PREPARATION

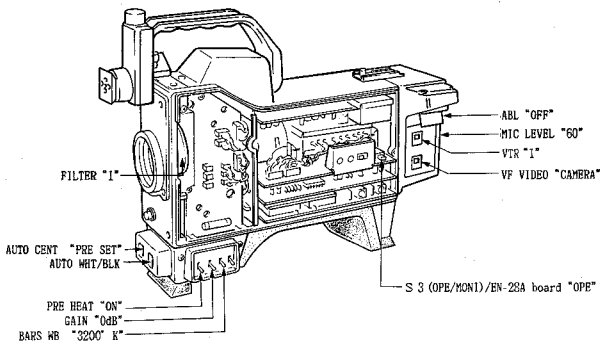
#### 4-1-1. Connection for Adjustment



Note : The composite video signal level varies depending upon the cable length between the camera and measuring equipment.

#### 4-1-2. Switch Position Before Adjustments

1. Set the camera switches as follows:



2. Release the back-up memory by changing over the S3(ADJ/OPE) switch on the AT-31 board as follows:

Step 1. Set the PRE HEAT switch at OFF.

Step 2. Set the S3 switch on the AT-31 board at ADJ mode.

Step 3. Set the PRE HEAT switch at ON.  
Then the "MEMORY NG" will be displayed on the viewfinder screen.

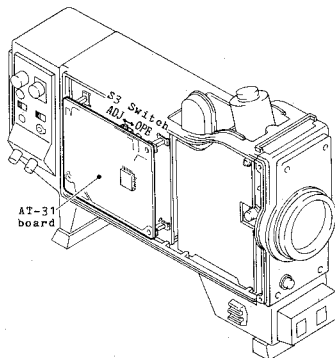
Step 4. Warm up for ten minutes with PRE HEAT switch "ON" before beginning adjustment.

Note : 1. If the following switches are tripped while adjusting the camera, the back-up memory must be re-released.

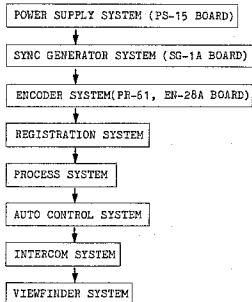
AUTO WHITE/BLACK switch

AUTO CENT switch

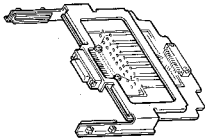
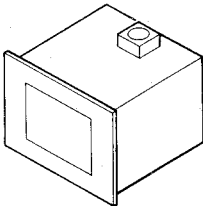
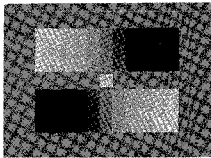
S3 (ADJ/OPE) switch



#### 4-1-3. Adjustment procedures



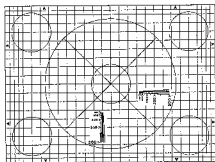
#### 4-1-4. Adjustment Fixtures and Equipment

<b>A-7511-997-A</b>	Extension Board EB-M3 (optional)
<ul style="list-style-type: none"> <li>For PS-15, IE-7, PR-61 and EN-28A board adjustment</li> </ul>	
	
<b>J-6020-490-A</b>	Pattern Box PTB-100
<ul style="list-style-type: none"> <li>Light source for test charts (90 to 130V AC)</li> </ul>	
	
<b>J-6021-880-A</b>	Gray scale chart
<ul style="list-style-type: none"> <li>For video level and gamma adjustment, etc.</li> </ul>	
	

**J-6021-900-A**

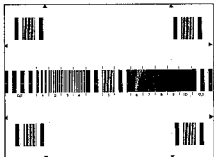
Registration chart

- For registration and rotation adjustment

**J-6022-690-A**

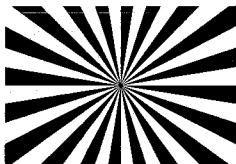
Multiburst

- For frequency response, focus and DTL adjustment

**J-6020-434-A**

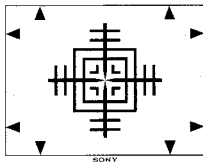
Siemens Star chart

- For back focus adjustment

**3-680-660-00**

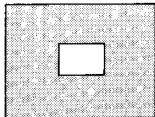
Auto Centering chart (supplied)

- For centering adjustment



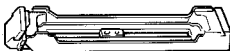
White Window chart

- For ABO adjustment



Make a hole in the center of black paper as shown in the figure.

Tripod Adaptor (VCT-M3)





Commercial measuring equipment

- . Dual Trace Oscilloscope
- . Vectorscope
- . Waveform monitor
- . Frequency counter
- . Digital Voltmeter

Commercial merchandise sold by SONY

- . B/W Monitor (FVM-91 or equivalent)
- . Color Monitor (BVM-1201 or equivalent)
- . AC Adaptor (CHA-7)
- . CF pulse generator (BVG-10)

4-1-5. Removal of the shading compensation glass in pattern box

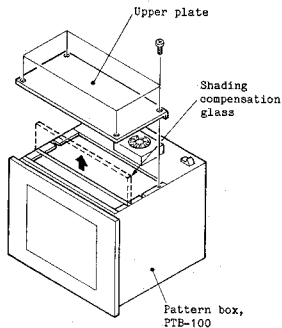
Remove the shading compensation glass in the pattern box when you adjust the following items:

4-5-3. GREEN Beam, ABO Adjustment

4-5-4. RED Beam, ABO Adjustment

4-5-5. BLUE Beam, ABO Adjustment

1. Remove the four fixing screws and remove the upper plate.
2. Remove the shading compensation glass as shown below.



Note : Avoid continuous using the pattern box which is removed the shading compensation glass, for a long time, in order to protect the tube of the camera and acrylic plate of the pattern box.

#### 4-2. POWER SUPPLY SYSTEM (PS-15 BOARD)

Note : Connect the extension board (EB-M3) to the PS-15 board before adjusting.

If an error is not greater than 1% with respect to the rated voltage, adjustment is unnecessary.

##### 4-2-1. +9.5V Regulator Adjustment

Equipment : Digital voltmeter

Test point : TP1 (GND : E1) / PS-15 board

Adj. point :  $\odot$  RV1

Spec. :  $+9.5V \pm 0.02V$  dc

##### 4-2-2. +9V Regulator Adjustment

Equipment : Digital voltmeter

Test point : TP2 (GND : E1) / PS-15 board

Adj. point :  $\odot$  RV2

Spec. :  $+9.0V \pm 0.02V$  dc

##### 4-2-3. +5V Regulator Adjustment

Equipment : Digital voltmeter

Test point : TP3 (GND : E1) / PS-15 board

Adj. point :  $\odot$  RV6

Spec. :  $+5.0V \pm 0.02V$  dc

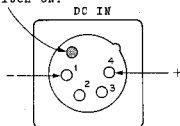
Note : When this adjustment is performed, all following must be readjusted.

#### 4-2-4. Battery Alarm Adjustment

Equipment : Digital voltmeter

Preparation : Connect the plus(+) side of power supply to pin 4 of the DC IN connector (CN 905) and minus (-) side to pin 1 of that respectively.

Pressing this pin makes the microswitch ON.



When power supply is fed without using an XLR plug, turn ON a microswitch attached to the DC IN connector. If the switch remains OFF, on power supply is fed to a camera.

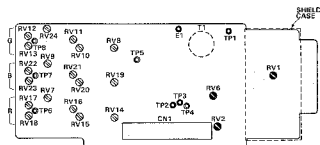
Adjustment :

1. Adjust the output voltage of DC power supply to  $11.1 \pm 0.5V$  dc.
2. Set  $\odot$  RV1 of IF-70 board to the position at which a BATT indicator in the viewfinder starts blinking.

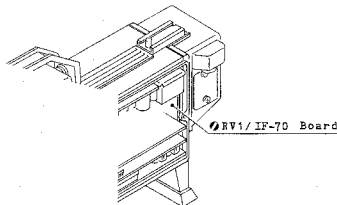
VF screen

BATT  $\leftarrow$  blink

$\odot$



PS-15 Board (Component side)



$\odot$  RV1 / IF-70 Board

### 4-3. SYNC GENERATOR SYSTEM (SG-1A BOARD)

#### 4-3-1. Sub-carrier Frequency Adjustment

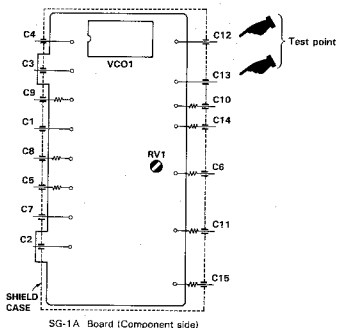
Note : Allow 10 minutes warm up before adjustment. Connect the extension board (EB-M3) to the EN-28A board and remove the shield-cover before adjusting.

Equipment : Frequency counter

Test point : C12 (GND : C13) / SG-1A board

Adj. point : RV1

Spec. :  $3,579,543 \pm 3\text{Hz}$



#### 4-3-2. V BLKG width Adjustment

Adj. point : S4/EN-28A board

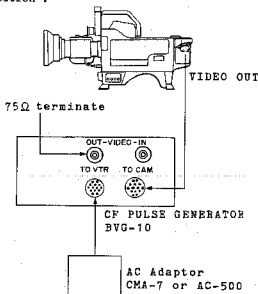
Adjust : Change over the vertical blanking width to 19H, 20H, and 21H, respectively.

#### 4-3-3. INT SC Phase Adjustment

Note : Be sure that video signal is not input to the GEN LOCK IN terminal of the camera.

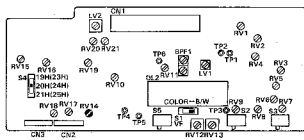
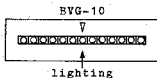
Equipment : CF pulse generator, BVG-10

Connection :



Adjust : 1. Set the BVG-10 SELECT knob at SOURCE CHECK.

2. Adjust RV14 on the EN-28A board so that the BVG-10 LED light comes to the center.



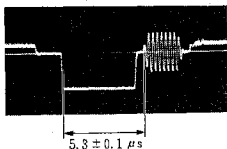
EN-28A Board (Component side)



#### 4-4-4. BURST phase and width Adjustment

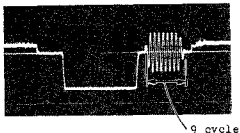
##### 1. BURST phase Adjustment

Equipment : Oscilloscope  
 Lens iris : Close "c"  
 To be extended : EN-28A board  
 Test point : TP4(GND : E1)/EN-28A board  
 Trigger : TP16(HD) / extension board  
 Adj. point : RV21 / EN-28A board  
 Spec. :  $5.3 \pm 0.1 \mu s$



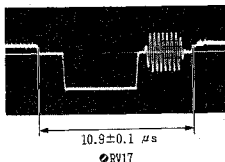
##### 2. BURST width Adjustment

Equipment : Waveform monitor  
 Lens iris : Close "c"  
 To be extended : EN-28A board  
 Test point : TP4(GND : E1)/EN-28A board  
 Adj. point : RV20/EN-28A board  
 Spec. : 9 cycle

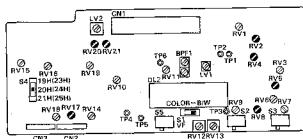


#### 4-4-5. H BLKG pulse width Adjustment

Equipment : Oscilloscope  
 Lens iris : Close "c"  
 To be extended : EN-28A board  
 Test point : TP4(GND : E1) / EN-28A board  
 Trigger : TP16(HD) / extension board  
 Adj. point : RV17 / EN-28A board  
 Spec. :  $10.9 \pm 0.1 \mu s$



Note : After completing this adjustment, be sure to carry out 4-4-8. Color Bar Size Adjustment.



EN-28A Board (Component side)

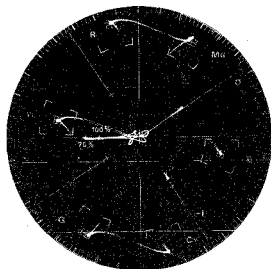
#### 4-4-6. Color Vector Adjustment

```
Equipment      : Vectorscope
Preparation    : Vectorscope gain
                  → 75% position
BARS/WB switch
                  → BARS position
```

To be extended : EN-28A board

Adjust :

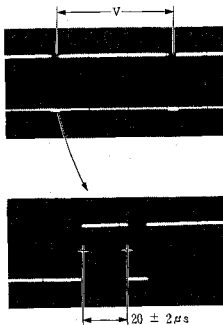
1. Adjust the **ORV19** on the **EN-28A** board so that the burst spot is located at 75% scale mark on the vectorscope.
2. Adjust the **ORV3** on the **EN-28A** board and the **PHASE** control on the vectorscope so that the burst spot is located on the burst graticule line.
3. Adjust the **ORV1**, **ORV11** and **OLV1** on the **EN-28A** board alternately and repeatedly two or three times so that all the chroma spots are located on the specified scale point on the vectorscope screen.
4. Alternately repeat item 1 to 3 two or three times.



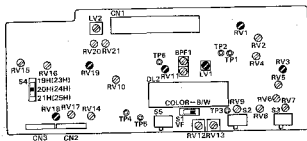
Note : After this adjustment is complete,  
return the BARS/WE switch to "3200°K."

#### 4-4-7. 1/2H pulse width Adjustment

Equipment : Oscilloscope  
To be extended : EN-28A board  
Test point : TP20(GND:TP30)/ extension board  
Trigger : TP15(VD)/ extension board  
Adj. point :  $\phi$ RV18 / EN-28A board  
Spec. : A=20 + 2us



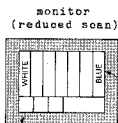
Note : If the pulse width does not vary when the  $\odot$  RV18 on the EN-28A board is turned, input trigger again in the following order.



EN-28A Board (Component side)

#### 4-4-8. Color Bar Size Adjustment

Equipment : Color monitor (reduced scan)  
Preparation : BARS/WB switch → BARS position  
To be extended : PR-61 board  
Test point : VIDEO OUT  
Adj. point : RV20 / PR-61 board  
Adjust : Adjust so that the right edge  
of the blue bar intruders  
slightly over the right edge  
of the monitor picture.



monitor blanking intrudes slightly

Note : When this adjustment is complete, be sure to carry out the 4-4-9. I and Q Signal Phase Adjustment.

#### 4-4-9. I and Q Signal Phase Adjustment

Note : Be sure to carry out 4-4-8. Color Bar  
Size Adjustment.

Equipment : Color monitor (reduced scan)

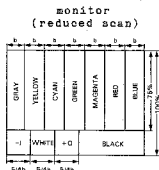
To be extended : EN-28A board

Preparation : BARS/WB switch

→ BARS position

Adj. point : RV15 / EN-28A board

Adjust : Set the I stripe width of the color bar signal to be five quarter of the gray stripe width.



## 4-4-10. Color Bar White Level Adjustment

Equipment : Waveform monitor

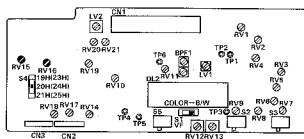
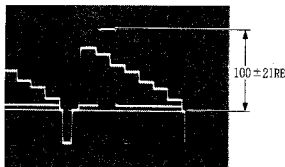
To be extended : EN-28A board

Preparation : BARS/WB switch

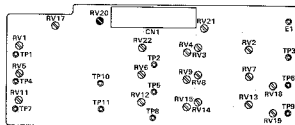
→ BARS position

Adj. point : RV16 / EN-28A board

Spec. : 100 + 2IRE



EN-28 A Board (Component side)

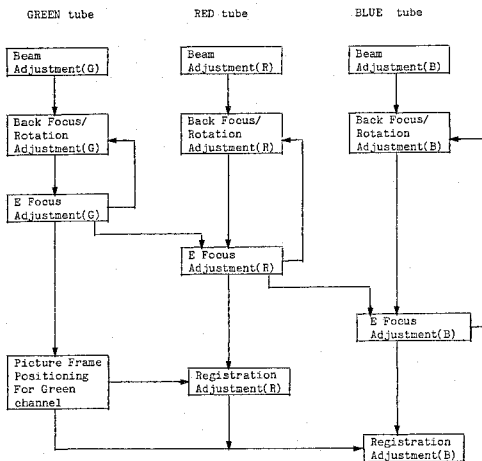


PR-61 Board (Component side)

#### 4-5. REGISTRATION SYSTEM

For registration adjustment, each adjustment effect each other, therefore, the repeated adjustment will be required.

It suitable to adjust in the following order when the each tube is replaced.



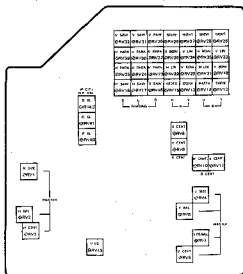


#### 4-5-1. H Deflection Balance Adjustment

Note : Be sure to calibrate the CH1 and CH2 of the oscilloscope, and set the vertical deflections of CH1 and CH2 at the same DC voltage range.

```
Equipment : Dual trace oscilloscope
Scope mode : ADD mode
Test point : CH1 TP1(GND : E1)
               on the DF-20 board
              CH2 TP2(GND : E1)
               on the DF-20 board
```

Trigger : HD(C10 / SG-1A board)  
Adj. point : RV2 / DF-20 board  
Adjust : Flat the waveform signal using  
RV2 on the DF-20 board.



DF-20 Board (Component side)

#### 4-5-2. V Deflection Balance Adjustment

Note : Be sure to calibrate the CH1 and CH2 of the oscilloscope and set the vertical deflections of CH1 and CH2 at the same DC voltage range.

1. V OS pulse width adjustment

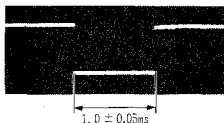
Equipment : Oscilloscope

Test point : 26 pin (GND : 1, 2 pin) on the  
Extension board (PS-15)

Trigger : VD (C11 / SG-1A board)

Adj. point :  $\phi$  RV43 / DF-20 board

Spec. :  $1 \pm 0.05\text{ms}$



## 2. V Deflection Balance and V OS Balance Adjustment

Equipment : Dual trace oscilloscope  
Test point : CH1 TP7(GND : E1)  
on the DF-20 board  
CH2 TP8(GND : E1)  
on the DF-20 board

Scope mode : ADD mode  
Trigger : VD (C11 / SG-1A board)  
Adj. point : (V Deflection Balance)  
ORV6 / DF-20 board  
(V OS Balance)

Adjust : Flat the waveform signal.

### V Deflection Balance Adjustment



## V OS Balance adjustment



#### 4-5-3. G. Beam, ABO Adjustment

Note : Avoid continuous shooting of bright object in order to protect the tubes, for a long period.

Object : White window chart

Equipment : Oscilloscope

To be extended : PS-15 board

Preparations :

- RV10 to Fully Counterclockwise○
  - RV11 to Fully Counterclockwise○
  - RV12 to Fully Counterclockwise○
  - RV24 to Fully Counterclockwise○
- } on the PS-15 board

Trigger : TP6(HD) / extension board

Adjust:

1. Adjust the zoom control so that the white window frame touches the underscanned picture frame on the monitor.
2. Open the lens iris gradually and adjust the RV13 on the PS-15 board so that the video waveform of TP27(GND:TP1) on the extension board just starts to clip at  $1.0 \pm 0.05V$ .



3. Fully turn the RV8 and RV11 on the PS-15 board clockwise○.
4. Adjust the lens iris control so that the video level at TP27(GND:TP1) on the extension board is 400 mVp-p.



5. Adjust the RV8 at TP8 (GND:E1) on the PS-15 board to the point where "A" just before to appear.

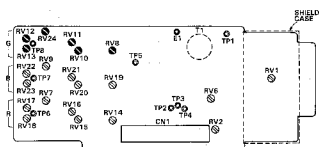


6. Rotate the RV11 fully counterclockwise○ and then gradually turn it clockwise○ until oscillation appears. Then turn it back and set it just where the oscillation begins.
7. Continue opening the iris, and set it just where oscillation begins. Rotate the RV11 clockwise○ until oscillation disappears.
8. Continue opening the iris, and set it just where oscillation begins. Rotate the RV12 clockwise○ until oscillation disappears.



9. Continue opening the iris, and set it just where oscillation begins. Rotate the RV24 clockwise○ until oscillation disappears.
10. Check either the white level must be over  $3.2 \pm 0.1V$  or, if the iris is opened three steps past where the white level at TP27 on the extension board is 400 mV, there must be lack of beam current. If neither of these conditions can be met, turn the RV11 slightly counterclockwise○ and repeat adjust item 6 to 9.

11. Adjust the RV10 so that the video level at TP27 on the extension board is  $3.0 \pm 0.2$  V.



PS-15 Board (Component side)

#### 4-5-4. R. Beam, ABO Adjustment

Note : Avoid continuous shooting of bright object in order to protect the tubes, for a long period.

Object : White window chart

Equipment : Oscilloscope

To be extended : PS-15 board

Preparations :

- RV15 to Fully Counterclockwise ○
- RV16 to Fully Counterclockwise ○ on the
- RV17 to Fully Counterclockwise ○ PS-15
- RV7 to Fully Counterclockwise ○ board

Trigger : TP6(HD) / extension board

Adjust:

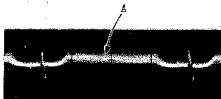
1. Adjust the zoom control so that the white window frame touches the underscanned picture frame on the monitor.
2. Open the lens iris gradually and adjust the RV18 on the PS-15 board so that the video waveform of TP23(GND:TP1) on the extension board just starts to clip at  $1.0 \pm 0.05$  V.



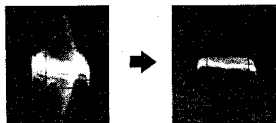
3. Fully turn the RV14 and RV16 on the PS-15 board clockwise ○.
4. Adjust the lens iris control so that the video level at TP23(GND:TP1) on the extension board is 400 mVp-p.



5. Adjust the RV14 at TP6 (GND:E1) on the PS-15 board to the point where "A" just before to appear.

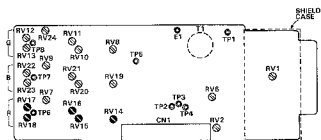


6. Rotate the RV16 fully counterclockwise ○ and then gradually turn it clockwise ○ until oscillation appears. Then turn it back and set it just where the oscillation begins.
7. Continue opening the iris, and set it just where oscillation begins. Rotate the RV16 clockwise ○ until oscillation disappears.
8. Continue opening the iris, and set it just where oscillation begins. Rotate the RV17 clockwise ○ until oscillation disappears.



9. Continue opening the iris, and set it just where oscillation begins. Rotate the RV7 clockwise ○ until oscillation disappears.
10. Check either the white level must be over  $2.7 \pm 0.1$  V or, if the iris is opened three steps past where the white level at TP23 on the extension board is 400 mV, there must be lack of beam current. If neither of these conditions can be met, turn the RV16 slightly counterclockwise ○ and repeat adjust item 6 to 9.

11. Adjust the  $\odot$  RV15 so that the video level at TP23 on the extension board is  $2.5 \pm 0.2$  V.



PS-15 Board (Component side)



#### 4-5-5. B. Beam, ABO Adjustment

Note : Avoid continuous shooting of bright object in order to protect the tubes, for a long period.

Object : White window chart  
Equipment : Oscilloscope  
To be extended : PS-15 board  
Preparations :

RV20 to Fully Counterclockwise  $\odot$   
RV21 to Fully Counterclockwise  $\odot$  } on the PS-15 board  
RV22 to Fully Counterclockwise  $\odot$   
RV9 to Fully Counterclockwise  $\odot$

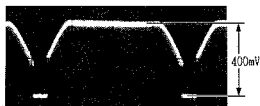
Trigger : TP6(HD) / extension board

Adjust:

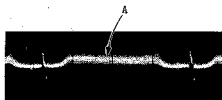
1. Adjust the zoom control so that the white window frame touches the underscanned picture frame on the monitor.
2. Open the lens iris gradually and adjust the RV23 on the PS-15 board so that the video waveform of TP25(GND:TP1) on the extension board just starts to clip at  $1.0 \pm 0.05V$ .



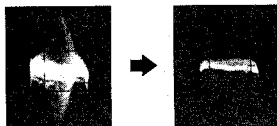
3. Fully turn the RV19 and RV21 on the PS-15 board clockwise  $\odot$ .
4. Adjust the lens iris control so that the video level at TP25(GND:TP1) on the extension board is 400 mV-p.



5. Adjust the RV19 at TP7 (GND:E1) on the PS-15 board to the point where "A" just before to appear.

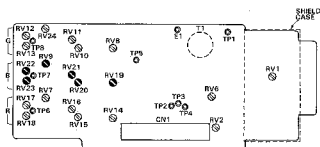


6. Rotate the RV21 fully counterclockwise  $\odot$  and then gradually turn it clockwise  $\odot$  until oscillation appears. Then turn it back and set it just where the oscillation begins.
7. Continue opening the iris, and set it just where oscillation begins. Rotate the RV21 clockwise  $\odot$  until oscillation disappears.
8. Continue opening the iris, and set it just where oscillation begins. Rotate the RV22 clockwise  $\odot$  until oscillation disappears.



9. Continue opening the iris, and set it just where oscillation begins. Rotate the RV9 clockwise  $\odot$  until oscillation disappears.
10. Check either the white level must be over  $2.7 \pm 0.1V$  or, if the iris is opened three steps past where the white level at TP25 on the extension board is 400 mV, there must be lack of beam current. If neither of these conditions can be met, turn the RV21 slightly counterclockwise  $\odot$  and repeat adjust item 6 to 9.

11. Adjust the RV20 so that the video level at TP25 on the extension board is  $2.5 \pm 0.2$  V.

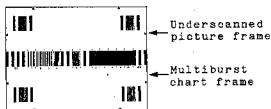


PS-15 Board (Component side)

#### 4-5-6. GREEN E. FOCUS Adjustment

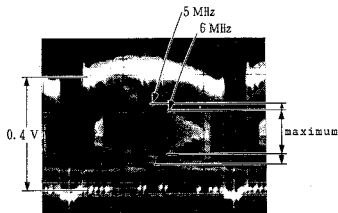
Object : Multiburst chart  
 Measuring equipment : Oscilloscope  
 To be extended : PS-15 board  
 Trigger : TP6(HD) / extension board

1. Adjust the zoom control so that the registration chart frame touches the underscanned picture frame on the monitor.



Monitor

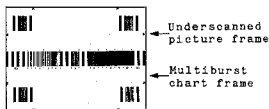
2. Adjust the iris control so that the video level corresponding to 0.5MHz at TP27 (GND: TP1) on the extension board is 0.4 Vp-p.
3. Adjust the focus control so that the waveform signal amplitude corresponding at 5MHz is maximized.
4. Adjust the RV3 on the PS-26 board so that the waveform signal amplitudes at both 5MHz and 6MHz are maximized.



#### 4-5-7. RED E. FOCUS Adjustment

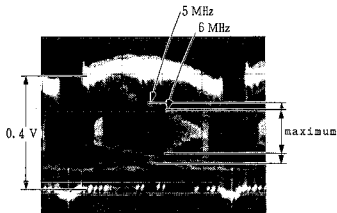
Object : Multiburst chart  
 Measuring equipment : Oscilloscope  
 To be extended : PS-15 board  
 Trigger : TP6(HD) / extension board

1. Adjust the zoom control so that the registration chart frame touches the underscanned picture frame on the monitor.



Monitor

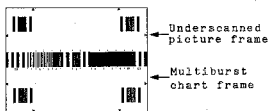
2. Adjust the iris control so that the video level corresponding to 0.5MHz at TP27 (GND : TP1) on the extension board is 0.4 Vp-p.
3. Adjust the focus control so that the waveform signal amplitude corresponding to 5MHz at TP23 on the extension board is maximized.
4. Adjust the RV2 on the PS-26 board so that the waveform signal amplitudes corresponding to both 5MHz and 6MHz at TP23 are maximized.





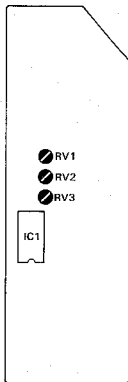
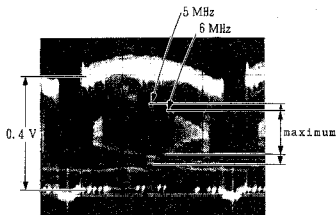
#### 4-5-8. BLUE E. FOCUS Adjustment

- Object : Multiburst chart  
 Measuring equipment : Oscilloscope  
 To be extended : PS-15 board  
 Trigger : TP6(HD) / extension board
- Adjust the zoom control so that the registration chart frame touches the underscanned picture frame on the monitor.



Monitor

- Adjust the iris control so that the video level corresponding to 0.5MHz at TP27 (GND: TP1) on the extension board is 0.4 Vp-p.
- Adjust the focus control so that the waveform signal amplitude corresponding to 5MHz at TP25 on the extension board is maximized.
- Adjust the RV1 on the PS-15 board so that the waveform signal amplitudes corresponding to both 5MHz and 6MHz at TP25 are maximized.



PS-26 Board  
 (Component side)

#### 4-5-9. GREEN Back Focus Adjustment

Note : Never turn the back focus adjusting screw shown below except when replacing the pick-up tube of G channel. Adjust the back focus adjustment.

However, when the pick-up tube is replaced or the adjustment cannot be made on the lens side, set the lens back focus ring at the marked position so as to make the following adjustment.

Object : Siemens Star chart

Preparations :

S3 / EN-28A board → "MONI"

S1 / AT-31 board → Mid position

S2 / AT-31 board → Upper position

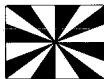
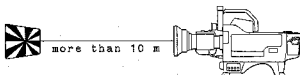
Lens iris : Open

1. Set the zoom control at TELE so as to obtain the maximum multiplication factor. Optically focus the image so as to obtain the maximum resolution.
2. Set the zoom control at WIDE so as to obtain the minimum multiplication factor. Do not optically focus the image at this time. Check whether the image is focused on the monitor while turning the zoom control from TELE to WIDE. If the image is not focused, properly set at back focus as follows.

3. Carefully loosen the setscrew shown below. When the zooming mechanism is set at WIDE, turn the back focus adjusting screw.

4. Tighten the setscrew after repeating Step 1 through Step 3 several times.

Note : When the zoom control is set at WIDE, be careful not to be exposed to strong light such as a fluorescent lamp.

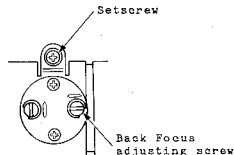
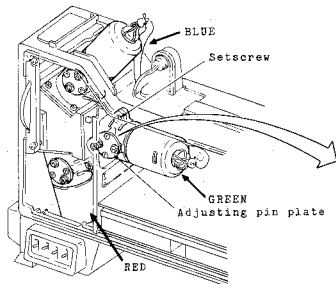


(TELE)



(WIDE)

monitor picture



#### 4-5-10. GREEN Rotation Adjustment

Note : After this adjustment, check the back focus adjustment in the green channel.

Object : Registration chart

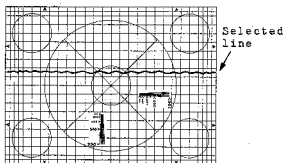
Preparation : Set the tripod adaptor horizontally by using a level, and then mount the camera. Set the registration chart at the horizontal position.

S3 / EN-28A board → "MONI"

S1 / AT-31 board → Mid position

S2 / AT-31 board → Upper position

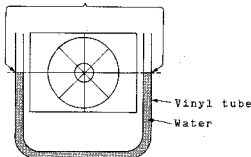
1. Select the lines by using a Waveform monitor and confirm that the horizontal line of the registration chart is in parallel with the selected line on the monitor.



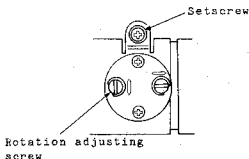
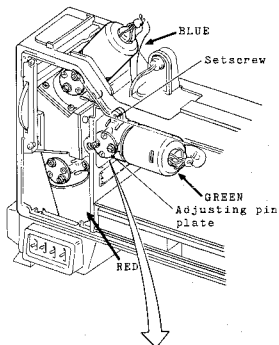
Monitor

The use of a transparent vinyl tube containing water, instead of a level, makes it possible to set the registration chart correctly at the horizontal position.

The horizontal line is adjusted.



2. If these 2 lines are not in parallel, make the following adjustments.
3. Carefully loosen the setscrew shown below:
4. Adjust the positioning screw so that the selected line on the monitor is in parallel with the horizontal line of the registration chart.
5. Carefully tighten the setscrew.



#### 4-5-11. RED Back Focus and Rotation Adjustment

Note : Be sure to carry out 4-5-9. GREEN Back Focus Adjustment, 4-5-10. GREEN Rotation Adjustment.

##### 1. Red Back Focus Adjustment

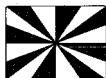
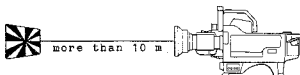
Object : Siemens Star chart

Preparation : S3 / EN-28A board → "MONI"

Lens iris : Open

Adjust :

- 1) S1 / AT-31 board → Mid position  
S2 / AT-31 board → Upper position
- 2) Set the zoom control at TELE so as to obtain the maximum multiplication factor.  
Do not touch the focus control after setting its position in this step during this adjustment.
- 3) S1 / AT-31 board → Upper position
- 4) Set the zoom control at TELE so as to obtain the maximum multiplication factor.  
If the image is not focused, carefully loosen the setscrew shown below and tighten the setscrew after the back focus adjusting screw is set at the optimum focus position.



(TELE)  
monitor picture



(WIDE)

Note : When the zoom control is set at WIDE, be careful not to be exposed to strong light such as a fluorescent lamp.

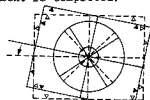
##### 2. Red Rotation Adjustment

Object : Registration chart

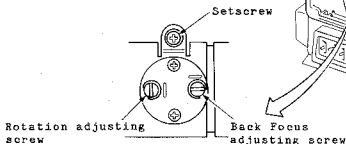
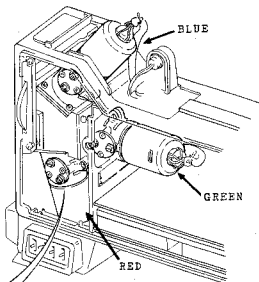
Adjust :

- 1) S1 / AT-31 board → Upper position  
S2 / AT-31 board → Upper position
- 2) Check whether 2 horizontal lines at the center of the R and -G picture are in parallel or overlapped.  
If these 2 lines are not in parallel or overlapped, make the following adjustments.
- 3) Carefully loosen the setscrew shown above.  
Adjust the positioning screw so that the horizontal line at the center of the R picture is overlapped or in parallel with the picture in the green channel.
- 4) Carefully tighten the setscrew.

Note : The Red Rotation adjustment exerts influence on the Red Back Focus adjustment, so be sure to check the Red Back Focus adjustment after the Rotation adjustment is completed.



Monitor



#### 4-5-12. BLUE Back Focus and Rotation Adjustment

Note : Be sure to carry out 4-5-9. GREEN Back Focus Adjustment, 4-5-10. GREEN Rotation Adjustment.

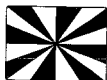
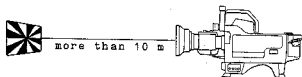
##### 1. Blue Back Focus Adjustment

Object : Siemens Star chart

Preparation : S3 / EN-28A board → "MONI"

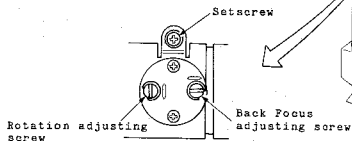
Lens iris : Open

- 1) S1 / AT-31 board → Mid position  
S2 / AT-31 board → Under position
- 2) Set the zoom control at TELE so as to obtain the maximum multiplication factor.  
Do not touch the focus control after setting its position in this step during this adjustment.
- 3) S1 / AT-31 board → Under position
- 4) Set the zoom control at TELE so as to obtain the maximum multiplication factor.  
If the image is not focused, carefully loosen the setscrew shown below and tighten the setscrew after the back focus adjusting screw is set at the optimum focus position.



(TELE) (WIDE)  
monitor picture

Note : When the zoom control is set at WIDE, be careful not to be exposed to strong light such as a fluorescent lamp.



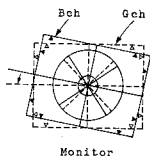
##### 2. BLUE Rotation Adjustment

Object : Registration chart

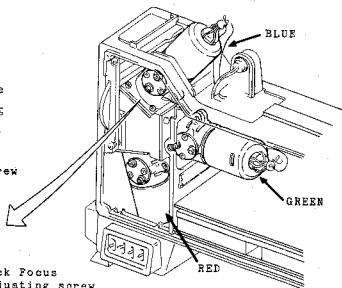
Adjust :

- 1) S1 / AT-31 board → Under position  
S2 / AT-31 board → Under position
- 2) Check whether 2 horizontal lines at the center of the B and -G picture are in parallel or overlapped.  
If these 2 lines are not in parallel or overlapped, make the following adjustments.
- 3) Carefully loosen the setscrew shown above.  
Adjust the positioning screw so that the horizontal line at the center of the B picture is overlapped or in parallel with the picture in the green channel.
- 4) Carefully tighten the setscrew.

Note : The BLUE Rotation adjustment exerts influence on the BLUE Back Focus adjustment, so be sure to check the BLUE Back Focus adjustment after the Rotation adjustment is completed.



Monitor



#### 4-5-13. Picture Frame Positioning Adjustment For Green channel

Note : Check the Rotation adjustment in the green channel before this adjustment.  
Set the tripod adaptor horizontally by using a level, and then mount the camera.  
Set the registration chart at the horizontal position.

Object : Registration chart

Preparations : The camera should be located right in front of the registration chart.

S3 / EN-28A board → MONI position

S1 / AT-31 board → Mid position

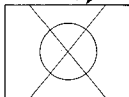
S2 / AT-31 board → Upper position

Lens iris : F16

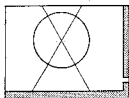
Adjust :

1. Zoom in to full TELE on the registration chart.

Underscanned monitor picture frame

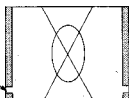


2. Rotate  $\text{RV1 (H SIZE)}$  and  $\text{RV4 (V SIZE)}$  fully counterclockwise.

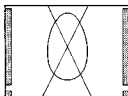


3. Adjust  $\text{RV3 (H CENT)}$  and  $\text{RV5 (V CENT)}$  so that the photo conductive mark can be seen on the left side of the registration chart.

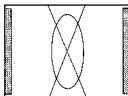
Photo conductive mark



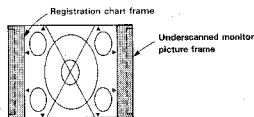
4. Adjust  $\text{RV5 (V CENT)}$  so that the top two photo conductive marks touch the top of the underscanned monitor picture frame.



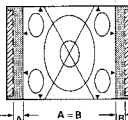
5. Adjust  $\text{RV4 (V SIZE)}$  so that the bottom two photo conductive marks touch the bottom of the underscanned monitor picture frame.



6. Set the zoom control and tilting the camera so that the registration chart frame and the underscanned monitor picture frame are touched in the direction of the vertical.




7. Pan the camera until the spaces on the right and left (A and B) between the registration chart frame and the nesa cut region are equal.

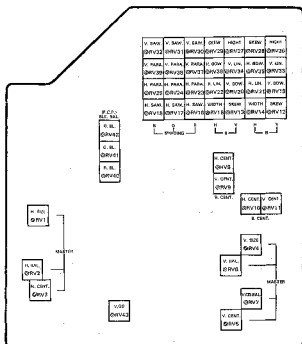
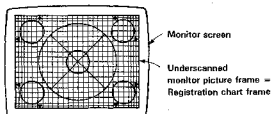


Note: This band can be seen when the camera is panned, but it disappears when the camera is stopped. Raising the monitor brightness makes it easily visible.

8. Adjust **ORV3 (H CENT)** to touch the left side of the underscanned monitor picture frame and the registration chart frame.



9. Adjust  RV1 (H SIZE) to touch the right side of the underscanned monitor picture frame and the registration chart frame.



DF-20 Board (Component side)

#### 4-5-14. Registration Adjustment

Note : Registration is established, without replacing the imaging tube, referring to the image on the green channel.

Don't touch the horizontal and vertical master centering, and horizontal and vertical master size controls for the green channel.

##### Remarks on the color monitor

The B/W monitor is suitable for establishing registration.

If necessary use the color monitor after convergence adjustment.

Mis-convergence on the camera and that on the color monitor cannot be distinguished if good convergence has not been obtained.

Fully turn the chrominance level adjuster on the color monitor counterclockwise(), or set the monitor in the B/W mode before starting convergence adjustment.

If there is mis-convergence, readjust it on the color monitor.

- (5) RV7(DTL LEV)/IE-7 board  
 —————> counterclockwise()  
 S3(MONI/OPE)/EN-28& board  
 —————> MONI position

##### Remarks on incident light

Incident light affects registration.

If bright spots appear in adark space, mis-registration occurs in the picture frame on the monitor. It cannot be corrected by adjusting the camera.

Set the waveform signal level at the waveform monitor level to 70IRE using the iris control during registration setting.

#### 2. Controls for establishing registration

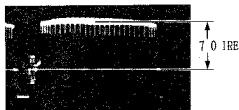
Adjust the controls only for the red and blue channels to establish registration.

The standard for establishing registration on the red and blue channels is as follows:

Horizontal	Vertical
OH CENT	OV CENT
OH WIDTH	OV HIGHT
OH LIN	OV LIN
OH BOW	OV BOW
OH SKEW	OV SKEW

#### 1. Preparations for establishing registration

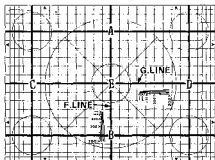
- (1) Set the filter at 0. After warming up the camera for about 30 minutes, adjust the controls to establish registration.
- (2) Set the registration chart in place, and the pattern box in the AUTO mode.
- (3) Position the grayscale chart over the entire frame using the zoom control. (Observe it on the B/W monitor.)
- (4) Set the video signal level at the waveform monitor to 70 IRE using the iris control during registration setting.





#### N-5-15. RED Registration Adjustment

Object : Registration chart



##### Preparations :

S1/AT-31 board → Upper position

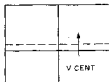
S2/AT-31 board → Upper position

##### Adjust :

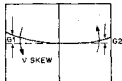
1. Adjust **OR-H CENT** control at the measuring point E on the test chart so that black line (red) of horizontal direction is located on the white line (green) of vertical direction.



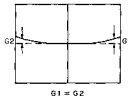
2. Adjust **OR-V CENT** control at the measuring point E on the chart so that black line (red) of horizontal direction is located on the white line (green) of horizontal direction.



3. Adjust **OR-V SKEW** control until the two horizontal lines (white and black) at measuring points C and D on the test chart deviate equally ( $G1=G2$ ).



4. Parallel the two horizontal lines (black and white) at measuring point G-line on the test chart by using **OR-V BOW** control.



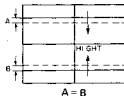
5. Adjusting the **OR-V BOW** control shifts the V centering. **OR-V CENT** control must be adjusted so that the two horizontal lines (white and black) overlap at measuring point G-line on the test chart.



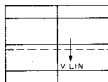
6. Alternately repeat the steps 2 to 5 two or three times so that the black line (red channel) of horizontal direction is located on the white line (green channel) of horizontal direction.
7. Keep an eye on measuring points A and B on the test chart and measure the deviation of the two lines (black and white).
8. Adjust **OR-V CENT** control until the two horizontal lines (white and black) at test chart measuring points A and B deviate equally ( $A=B$ ).



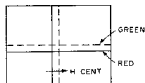
9. Adjust **OR HIGHT** control until the two horizontal lines (black and white) at both measuring points A and B on the test chart overlap.



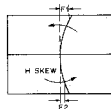
10. Adjusting **OR HIGHT** control shifts the V centering. **OR-V LIN** control must be adjusted so that the two horizontal lines overlap at measuring point G-lines on the test chart.



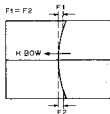
11. Alternately repeat the steps 8 to 10 two or three times so that the two horizontal lines (white and black) overlap at measuring point A, B and E.
12. Keep an eye at measuring point E on the test chart and adjust **OR-H CENT** control until the two vertical lines (white and black) overlap.



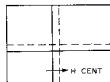
13. Keep an eye at measuring point F-line on the test chart and adjust **OR-H SKEW** control until the two vertical lines (white and black) deviate equally ( $F1=F2$ ).



14. Parallel the two vertical lines (black and white) at measuring point F-line on the test chart by using **OR-H BOW** control.



15. Adjusting **OR-H BOW** control shifts the H centering. **OR-H CENT** control must be adjusted so that the two vertical lines (white and black) overlap at measuring point F-line on the test chart.

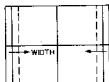


16. Alternately repeat the steps 1 to 4 two or three times until the two lines (white and black) overlap on the vertical screen center at measuring point F-line).
17. Keep an eye on measuring points C and D and measure the deviation of the white and black lines.
18. Adjust **OR-H CENT** until the two vertical lines (white and black) at measuring points C and D on the test chart deviate equally.



19. Adjust **OR WIDTH** until the two vertical lines (white and black) at both measuring points C and D on the test chart overlap.

(**OR WIDTH** → counterclockwise)



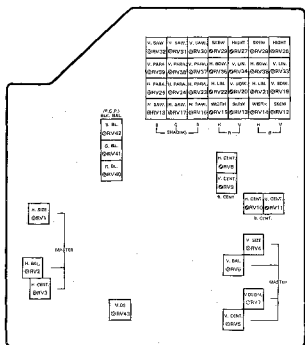
(**OR WIDTH** → clockwise)



20. Adjusting the  $\phi$ R WIDTH shifts the H centering.  
 $\phi$ R-H LIN must be adjusted so that the two vertical lines (white and black) other overlap each at measuring point E (screen center).



21. Alternate steps 17 to 19 several times until the two vertical lines (white and black) overlap each other at measuring point C, D and E.



DF-20 Board (Component side)

#### 4-5-16. BLUE Registration Adjustment

Object : Registration chart



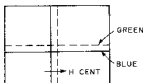
##### Preparations :

S1/AT-31 board → Upper position

S2/AT-31 board → Under position

##### Adjust :

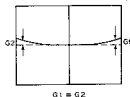
1. Adjust **OB-H CENT** control at the measuring point E on the test chart so that black line (red) of horizontal direction is located on the white line (green) of vertical direction.



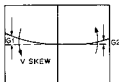
2. Adjust **OB-V CENT** control at the measuring point E on the chart so that black line (red) of horizontal direction is located on the white line (green) of horizontal direction.



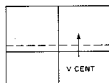
3. Adjust **OB-V SKEW** control until the two horizontal lines (white and black) at measuring points C and D on the test chart deviate equally ( $G1=G2$ ).



4. Parallel the two horizontal lines (black and white) at measuring point G-line on the test chart by using **OB-V BOW** control.



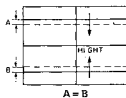
5. Adjusting the **OB-V BOW** control shifts the V centering. **OB-V CENT** control must be adjusted so that the two horizontal lines (white and black) overlap at measuring point G-line on the test chart.



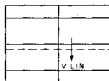
6. Alternately repeat the steps 2 to 5 two or three times so that the black line (blue channel) of horizontal direction is located on the white line (green channel) of horizontal direction.
7. Keep an eye on measuring points A and B on the test chart and measure the deviation of the two lines (black and white).
8. Adjust **OB-V CENT** control until the two horizontal lines (white and black) at test chart measuring points A and B deviate equally ( $A=B$ ).



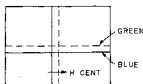
9. Adjust **OB HIGHT** control until the two horizontal lines (black and white) at both measuring points A and B on the test chart overlap.



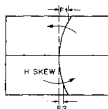
10. Adjusting **OB HIGHT** control shifts the V centering. **OB-V LIN** control must be adjusted so that the two horizontal lines overlap at measuring point G-lines on the test chart.



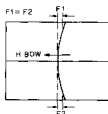
11. Alternately repeat the steps 8 to 10 two or three times so that the two horizontal lines (white and black) overlap at measuring point A, B and E.
12. Keep an eye at measuring point E on the test chart and adjust **OB-H CENT** control until the two vertical lines (white and black) overlap.



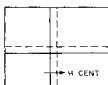
13. Keep an eye at measuring point F-line on the test chart and adjust **OB-H SKEW** control until the two vertical lines (white and black) deviate equally ( $F1=F2$ ).



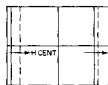
14. Parallel the two vertical lines (black and white) at measuring point F-line on the test chart by using **OB-H BOW** control.



15. Adjusting **OB-H BOW** control shifts the H centering. **OB-H CENT** control must be adjusted so that the two vertical lines (white and black) overlap at measuring point F-line on the test chart.



16. Alternately repeat the steps 1 to 4 two or three times until the two lines (white and black) overlap on the vertical screen center at measuring point F-line).
17. Keep an eye on measuring points C and D and measure the deviation of the white and black lines.
18. Adjust **OB-H CENT** until the two vertical lines (white and black) at measuring points C and D on the test chart deviate equally.



19. Adjust **OB-R WIDTH** until the two vertical lines (white and black) at both measuring points C and D on the test chart overlap.

**OB WIDTH** → counter-clockwise

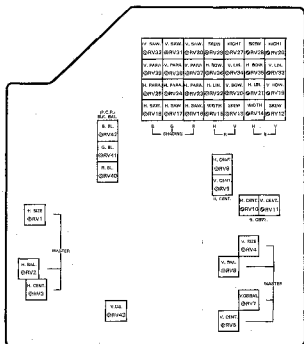
**OB WIDTH** → clockwise



● B-H LIN must be adjusted so that the two vertical lines (white and black) other overlap each at measuring point E (screen center).



21. Alternate steps 17 to 19 several times until the two vertical lines (white and black) overlap each other at measuring point C, D and E.

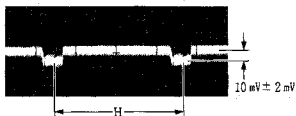


DF-20 Board (Component side)

#### 4-6. PROCESS SYSTEM

##### 4-6-1. Bias Light Adjustment

Equipment : Oscilloscope  
 Lens iris : Close "C"  
 To be extended : PR-61 board  
 Test point : TP1 (GND:E1)/PR-61 board  
 Trigger : TP16 (HD)/extension board  
 Adj. point :  $\odot$  RV1/CN-97 board  
 Spec. :  $10 \pm 2\text{mV}$

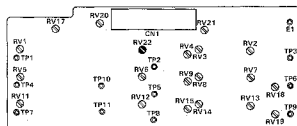
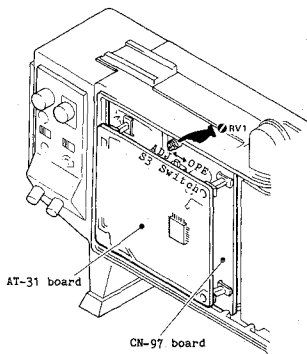


##### 4-6-2. GREEN Offset Adjustment

Equipment : Oscilloscope  
 Lens iris : Close "C"  
 To be extended : PR-61 board  
 Test point : TP2 (GND:E1)/PR-61 board  
 Trigger : TP16 (HD)/extension board  
 Adj. point :  $\odot$  RV22/PR-61 board



4. ALIGNMENT



PR-61 Board (Component side)

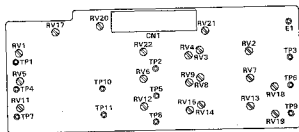
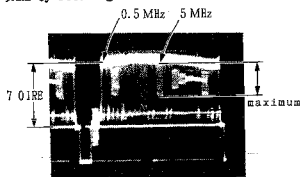
#### 4-5-3. GREEN PA Frequency Response Adjustment

Object : Multiburst chart  
Equipment : Waveform Monitor and Oscilloscope

To be extended : PR-61 board

Preparation :

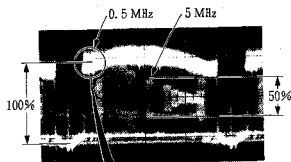
1. Adjust the zoom control so that the Multiburst chart frame touches the underscanned picture frame on the monitor.
2. Adjust the iris control so that the video level corresponding to the 0.5MHz is 500mV.
3. Maximize the waveform signal amplitude at 5MHz by focusing of the lens.



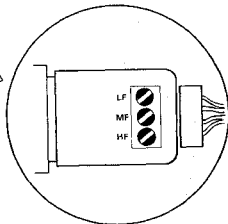
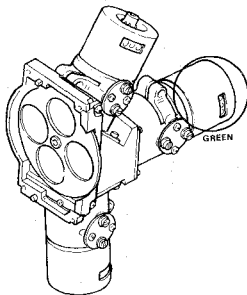
PR-61 Board (Component side)

Test point : TP1 (GND:E1)/PR-61 board  
Adjust :

1. Flat the waveform signal at 5MHz using the  $\odot$  CV1 (LF) on the PA-22 board.
2. Minimize the spike amplitude level at 0.5MHz using the  $\odot$  RV2 (MF) on the PA-22 board.
3. Alternately repeat the item 1. and 2. two or three times.
4. Adjust the  $\odot$  RV1 (HF) on the PA-22 board so that the ratio of the amplitude at 5MHz to 0.5MHz is 50%.



Flat the waveform and minimize the spike amplitude level





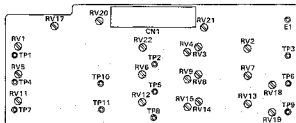
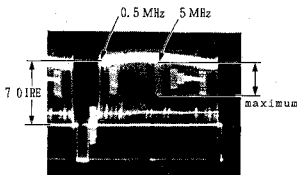
#### 4-6-4. RED PA Frequency Response Adjustment

Object : Multiburst chart  
Equipment : Waveform Monitor and Oscilloscope

to be extended : PR-61 board

Preparation :

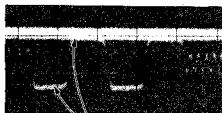
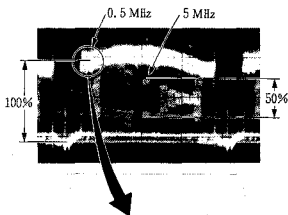
1. Adjust the zoom control so that the Multiburst chart frame touches the underscanned picture frame on the monitor.
2. Adjust the iris control so that the video level corresponding to the 0.5MHz is 500mV.
3. Maximize the waveform signal amplitude at 5MHz by focusing of the lens.



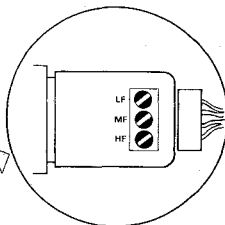
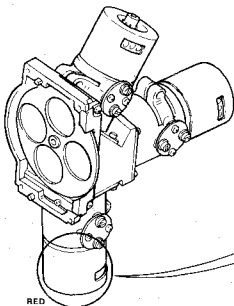
PR-61 Board (Component side)

Test point : TP1 (GND:E1)/PR-61 board  
Adjust :

1. Flat the waveform signal at 5MHz using the  $\odot$  CV1 (LF) on the PA-22 board.
2. Minimize the spike amplitude level at 0.5MHz using the  $\odot$  RV2 (MF) on the PA-22 board.
3. Alternately repeat the item 1. and 2. two or three times.
4. Adjust the  $\odot$  RV1 (HF) on the PA-22 board so that the ratio of the amplitude at 5MHz to 0.5MHz is 50%.



Flat the waveform and minimize the spike amplitude level



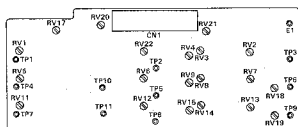
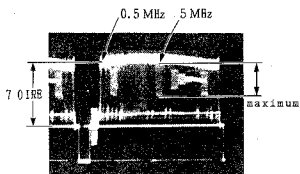
#### 4-6-5. BLUE PA Frequency Response Adjustment

Object : Multiburst chart  
Equipment : Waveform Monitor and Oscilloscope

To be extended : PR-61 board

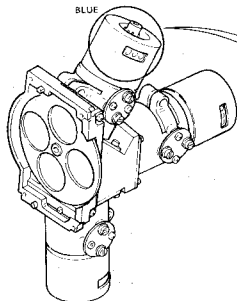
Preparation :

1. Adjust the zoom control so that the Multiburst chart frame touches the underscanned picture frame on the monitor.
2. Adjust the iris control so that the video level corresponding to the 0.5MHz is 500mV.
3. Maximize the waveform signal amplitude at 5MHz by focusing of the lens.



PR-61 Board (Component side)

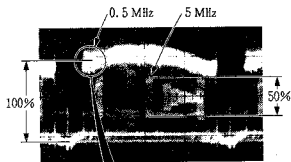
BLUE



Test point : TP1 (GND:E1)/PR-61 board

Adjust :

1. Flat the waveform signal at 5MHz using the  $\odot$  CV1 (LF) on the PA-22 board.
2. Minimize the spike amplitude level at 0.5MHz using the  $\odot$  RV2 (MF) on the PA-22 board.
3. Alternately repeat the item 1. and 2. two or three times.
4. Adjust the  $\odot$  RV1 (HF) on the PA-22 board so that the ratio of the amplitude at 5MHz to 0.5MHz is 50%.



Flat the waveform and minimize the spike amplitude level

#### 4-5-6. GREEN APC and AGC Adjustment

To be extended : IE-7 board

Object : Grayscale chart

(Use the pattern box in the  
AUTO mode.)

Zoom control : Position the grayscale chart  
over the entire frame using the  
zoom control.

Iris control : Set the lens AUTO/MANUAL switch  
attached to the lens assembly at  
MANUAL.

Set the waveform signal level at  
TP12 on the extension (IE-7)  
board to 0.6 V<sub>p-p</sub> using the iris  
control.

Scope trig : HD (TP16/Extension board)

At TP12 on the  
extension  
(IE-7) board



(APC Adjustment)

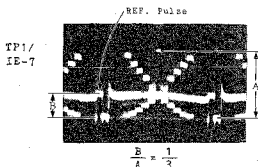
##### 1. Preset Adjustment

Test point : TP1 (GND:E1)/IE-7 board

Adj. point : RV4/IE-7 board

Adjust :

Connect between TP9 and TP10 (-5V) on the IE-7  
board.



Note : If the preset adjustment is not  
satisfied, change the S1 (0°/180°) switch  
on the IE-7 board.

#### 2. 1H/2H SEP Adjustment

Test point : TP1 (GND:E1)/IE-7 board

Adj. point : RV2/IE-7 board

Adjust :



A = B

TP1/  
IE-7



(AGC Adjustment)

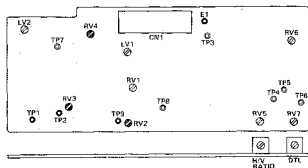
Test point : TP2 (GND:E1)/IE-7 board

Adj. point : RV3/IE-7 board

Spec. : 0.6V ± 0.01V

REF. Pulse

TP2/  
IE-7



IE-7 Board (Components side)

#### 4-6-7. G-ch Video Level Adjustment

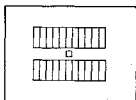
Object : Grayscale chart

Equipment : Oscilloscope

To be extended : PR-61 board

Adjust :

1. Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.

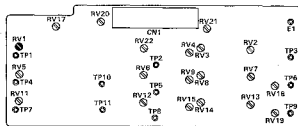


monitor

2. Adjust the iris control so that the white level at TP1 (GND:E1) on the PR-61 board is 400 mVp-p.



3. Adjust the RV1 on the PR-61 board so that the white level at TP2 (GND:E1) on the PR-61 board is  $600 \pm 10$  mV.

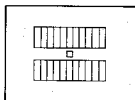


PR-61 Board (Component side)

#### 4-6-8. R-ch Video Level and Pre-Sub-gain Adjustment

Object : Grayscale chart  
Equipment : Oscilloscope  
To be extended : PR-61 board  
Adjust :

1. Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.



monitor

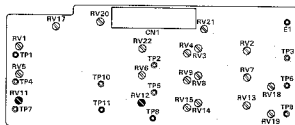
2. Adjust the iris control so that the white level at TP1 (GND:E1) on the PR-61 board is 400 mVp-p.



3. Adjust the RV11 on the PR-61 board so that the video level at TP11 (GND:E1) on the PR-61 board is  $270 \pm 10$  mV.



4. Adjust the RV12 on the PR-61 board so that the sub-gain level at TP8 (GND:E1) on the PR-61 board is  $600 \pm 10$  mV.

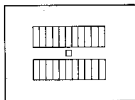


PR-61 Board (Component side)

#### 4-6-9. B-ch Video Level and Pre-Sub-gain Adjustment

```
Object      : Grayscale chart
Equipment   : Oscilloscope
To be extended : PR-61 board
Adjust      :
```

1. Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.

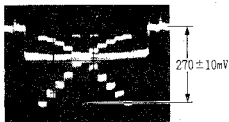


monitor

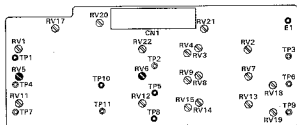
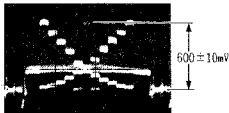
2. Adjust the iris control so that the white level at TP1 (GND:E1) on the PR-61 board is 400 mVp-p.



3. Adjust the **RV5** on the PR-61 board so that the video level at TP10 (GND:E1) on the PR-61 board is  $270 \pm 10$  mV.



4. Adjust the RV6 on the PR-61 board so that the sub-gain level at TP5 (GND:E1) on the PR-61 board is  $600 \pm 10$  mV.




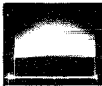




PR-61 Board (Component side)

#### 4-6-10. Black Shading Adjustment

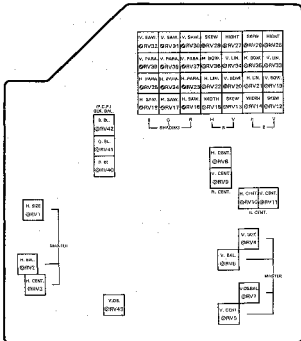
Lens iris : Close "C"  
 Equipment : Waveform Monitor  
 Preparations : GAIN switch → 18dB  
                   S3/EN-28A board → "MONI"  
 Adjust : Adjust the RVs so that all waveforms are flat.

Switch setting / AT-31 board		Adjusting point / DF-20 board			
G	S1 → Mid position	H SAW	V SAW	H PARA	V PARA
	S2 → Upper position	RV17	RV31	RV24	RV38
R	S1 → Upper position	H SAW	V SAW	H PARA	V PARA
	S2 → Upper position	RV16	RV30	RV23	RV37
B	S1 → Under position	H SAW	V SAW	H PARA	V PARA
	S2 → Under position	RV18	RV32	RV25	RV39

4. ALIGNMENT



#### 4-6-11. Black Set Adjustment

Lens iris : Close "C"

Equipment : Waveform monitor

Preparations :

S3/EN-28A board → MONI position

S1/AT-31 board → Mid position

S2/AT-31 board → Upper position

Adjust :

1. Adjust the  $\text{RV41}$  on the DF-20 board so that the pedestal level does not change when selecting the GAIN switch from 0dB to 18dB or vice versa.
2. S1/AT-31 board → Upper position
3. Adjust the  $\text{RV40}$  on the DF-20 board so that the pedestal level does not change when selecting the GAIN switch from 0dB to 18dB or vice versa.
4. S1/AT-31 board → Under position
5. Adjust the  $\text{RV42}$  on the DF-20 board so that the pedestal level does not change when selecting the GAIN switch from 0dB to 18dB or vice versa.



Note : After this adjustment is completed, reset the GAIN switch to 0dB.

#### 4-6-12. Green Pedestal Adjustment

Lens iris : Close "C"

Equipment : Oscilloscope

To be extended : PR-61 board

Test point : TP3 (GND:E1)/PR-61 board

Trigger : TP16 (HD)/extension board

Preparations :

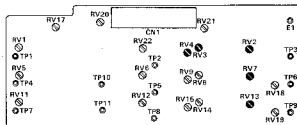
S3/EN-28A board → MONI position

S1/AT-31 board → Mid position

S2/AT-31 board → Upper position

Adj. point :  $\text{RV2/PR-61 board}$

Spec. :  $40 \pm 5 \text{ mV}$



PR-61 Board (Component side)

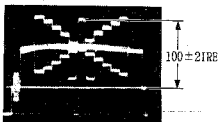


#### 4-6-13. Green Gamma Balance and Gamma Set Adjustment

Note : Be sure to carry out 4-6-12. Green Pedestal Adjustment before this adjustment.

Object : Grayscale Chart  
Equipment : Waveform monitor  
To be extended : PR-61 board  
Preparation : S3/AT-31 board → "OPE"  
Adjust :

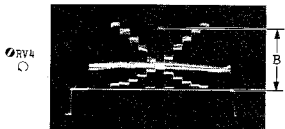
1. Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.
2. Adjust the iris control so that the white level at the VIDEO OUT is  $100 \pm 2 \text{IRE}$ .



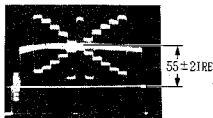
3. Adjust the  $\text{RV3}$  on the PR-61 board so that the white level at TP3 on the PR-61 board is stable at 1.4 V when the  $\text{RV4}$  on the PR-61 board is turned fully clockwise or counterclockwise.



A = B



4. Adjust the  $\text{RV4}$  on the PR-61 board so that the cross point level at TP3 on the PR-61 board is  $55 \pm 2 \text{IRE}$ .



Note : After this adjustment is completed, be sure to carry out the following item:

4-6-12. GREEN Pedestal Adjustment

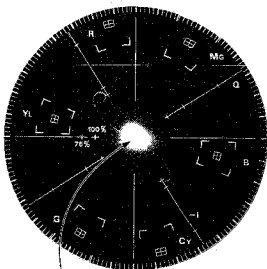
4-6-13. GREEN Gamma Balance and Gamma Set Adjustment

4-6-14. RED and BLUE Pedestal Adjustment

#### 4-6-14. Red and Blue Pedestal Adjustment

Lens iris : Close "C"  
Equipment : Vectorscope "MAX GAIN"  
To be extended : PR-61 board  
Adjust :

1. Adjust the  $\text{RV7}$  and  $\text{RV13}$  on the PR-61 board so that the beam spot is positioned in the center of the vectorscope.



black bright spot

4-6-15. Red and Blue Gamma Balance, Gamma Set  
and Sub-gain Adjustment

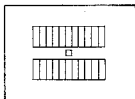
Note : Be sure to carry out 4-6-8. Red Video  
Level and Sub-gain Pre-adjustment, 4-6-9.  
Blue Video Level and Sub-gain  
Pre-adjustment, 4-6-14. Red and Blue  
Pedestal Adjustment.

Object : Grayscale chart  
Equipment : Waveform monitor and  
Vectorscope "MAX GAIN"

To be extended : PR-61 board

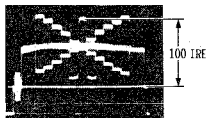
Adjust :

1. Adjust the zoom control so that the  
Grayscale chart frame touches the underscanned  
picture frame on the monitor.

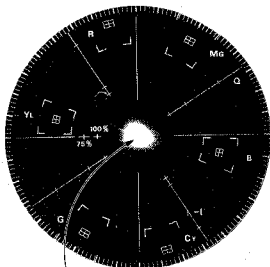


monitor

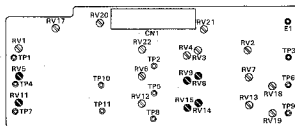
2. Adjust the iris control so that the VIDEO  
OUT level is 100IRE.



3. Fully turn both  $\odot$ RV14 and  $\odot$ RV8 on the  
PR-61 board counterclockwise  $\odot$ , and both  
 $\odot$ RV15,  $\odot$ RV9 on the PR-61 board clockwise  $\odot$ .
4. Adjust the  $\odot$ RV5,  $\odot$ RV11 on the PR-61 board  
so that the beam spot is positioned in the  
center of the vectorscope.
5. Adjust the  $\odot$ RV14,  $\odot$ RV8,  $\odot$ RV15 and  $\odot$ RV9  
on the PR-61 board so that the beam spot is  
positioned in the center of the vectorscope.
6. Repeat Step 4 through Step 5 several times.



black bright spot



PR-61 Board (Component side)

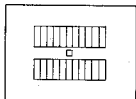
#### 4-6-16. White Clip Adjustment

Object : Grayscale chart  
Equipment : Waveform monitor and Oscilloscope

To be extended : PR-61 board

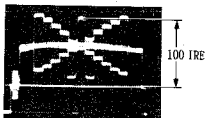
Adjust :

1. Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.



monitor

2. Adjust the iris control so that the VIDEO OUT level is 100 IRE.



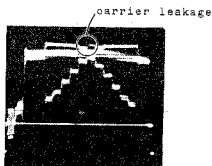
3. Set the GAIN switch at "9".

4. Adjust the RV17 on the PR-61 board so that the white level at TP3 (GND:E1) on the PR-61 board is  $1.6 \pm 0.02V$ .

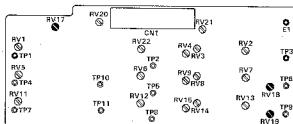


$$A = 1.6V \pm 0.02V$$

5. Adjust the RV18, RV19 so that the carrier leakage in the white peak level on the waveform monitor is minimized.



Note : After completing this adjustment, set the GAIN switch at "0" position.



PR-61 Board (Component side)

#### 4-6-17. IE (Crispening, H/V. Ratio and DTL Level) Adjustment

Note : Parts replacement do not affect the  $\odot$ RV1,  $\odot$ RV2,  $\odot$ RV4,  $\odot$ LV1 and  $\odot$ LV2 on the IE-7 board settings. These five adjusting variable resistors are set at the factory and should not be adjusted on site.

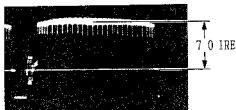
Object : Registration chart  
Equipment : Waveform monitor and Oscilloscope

To be extended : IE-7 board

Preparations :

Adjust the zoom control so that the Registration chart frame touches the underscanned picture frame on the monitor.

Adjust the iris control so that the VIDEO OUT level is 70IRE.



#### 1. Crispening adjustment

Preparations :

Set  $\odot$ RV7 on the IE-7 board to the mechanical center and fully turn  $\odot$ RV5 on the IE-7 board clockwise.

Test point : TP5 (GND:E1)/IE-7 board

Adj. point :  $\odot$ RV6/IE-7 board

Spec. :  $40 \pm 4$  mV



#### 2. H/V ratio adjustment

Preparation :

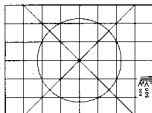
S3/EN-28A board  $\rightarrow$  MONI position

S1/AT-31 board  $\rightarrow$  Mid position

S2/AT-31 board  $\rightarrow$  Upper position

Adjust :

Keep an eye on the center circle on the registration chart and adjust  $\odot$ RV5 on the IE-7 board so that the H and V detail volume is balanced.



#### 3. DTL adjustment

Object : Multiburst chart

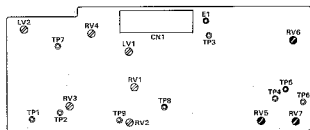
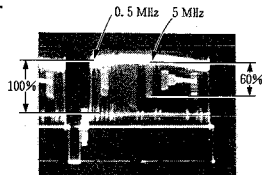
Preparations :

Adjust the zoom control so that the Multiburst chart frame touches the underscanned picture frame on the monitor.

Adjust the iris control so that the video level corresponding to 0.5MHz on the Waveform monitor is 70 IRE.

Adjust :

Adjust the  $\odot$ RV7 on the IE-7 board so that the ratio of the amplitude at 5MHz to 0.5MHz is 60%.



#### 4-7 AUTOMATIC CONTROL SYSTEM

##### 4-7-1. Automatic Iris Control Adjustment

Object : Grayscale chart  
Equipment : Waveform monitor  
Preparations :

Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture on the monitor.

Focus the image using the optical focus control.

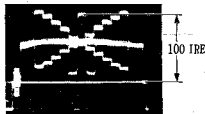
Set the S3 on the EN-28A board at OPE position.

Fully turn the RV1 on the AT-31 board clockwise.

Set the lens AUTO/MANUAL select at AUTO position.

Adjust :

Adjust the white portion of the Grayscale chart at 100IRE using RV2 on the AT-31 board.



##### 4-7-2. Low Light Adjustment

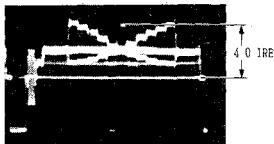
Object : Grayscale chart  
Equipment : Waveform monitor  
Preparation :

Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture on the monitor.

Focus the image using the optical focus control.

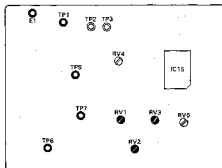
Adjust :

1. Set the white portion of the grayscale at 40IRE using iris control.



2. Adjust the RV3 on the AT-31 board so that the character of "LOW LIGHT" is appeared on the viewfinder screen.
3. Open the iris gradually and make sure that the LOW LIGHT reading disappears from the viewfinder when the white level of the grayscale is 47IRE.

If it does not disappear, repeat item (2).



AT-31 Board (Component side)

#### 4-7-3. ABL Adjustment

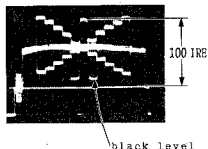
Object : Grayscale chart  
 Equipment : Waveform monitor  
 Preparation :

Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.

Focus the image using the optical focus control.

Adjust :

1. Adjust the iris control so that the white portion level of the grayscale is 100IRE.
2. Adjust the RV5 on the AT-31 board so that the black portion level of the grayscale does not change when selecting the ABL switch from ON to OFF or vice versa.

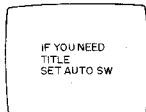


#### 4-7-4. Character Size Adjustment

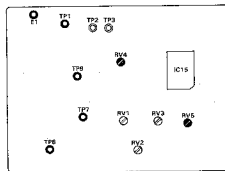
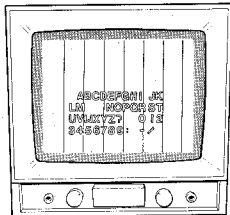
Equipment : B/W monitor or color monitor  
 Preparation : Set the BARS/WE switch to BARS position.

Adjust :

1. When the DISP CHG switch is pressed twice, the following is displayed.

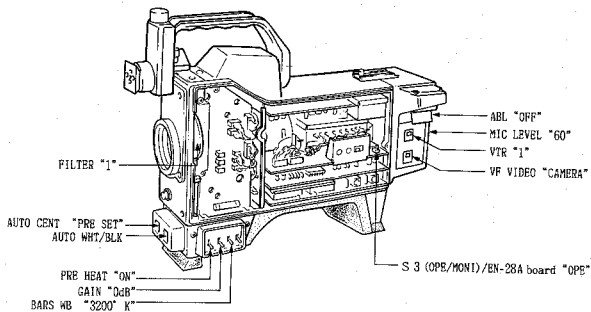


2. Press the DISP CHG switch again. Use the AUTO W/B BAL switch to display 12 characters on one line. Adjust RV4 on the AT-31 board until the end of the 12 characters string touch the boundaries of sixth and seventh color bars.



AT-31 Board (Component side)

# Final Switches Setting

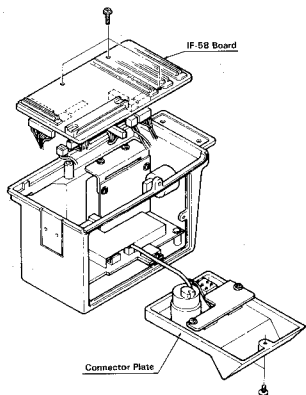


#### 4-8. INTERCOM SYSTEM

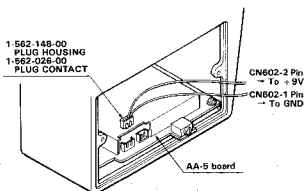
##### 4-8-1. SIDE TONE Adjustment

###### Preparation :

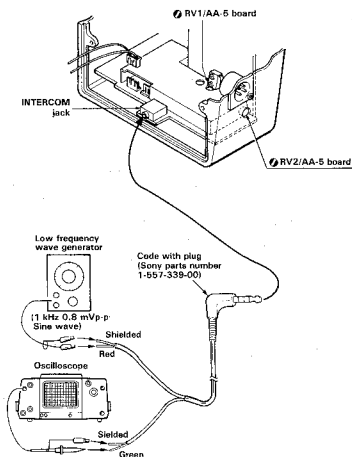
1. Remove the IF box referring to 3-1-5. Removal of the IF box in Section 3.
2. Remove the three IF-70 board retaining screws and six connectors (CN502 through CN507), and remove the IF-70 board. Remove the two connector plate retaining screws, and remove the connector plate.



3. Remove the CN602 connector. Connect the connector made by yourself, and supply +9V to the CN602-2 pin, GND to the CN602-1 pin.



###### Equipment/Connection



Test point : INTERCOM PHONE jack

Preparation : Set the RV2 on the AA-5 board to fully clockwise.

Adj. point : RV1/AA-5 board

Adjustment :

1. Turn the RV1 fully counterclockwise and measure the output level "A".
2. Adjust the RV1 so that 60% of output level "A" is indicated.

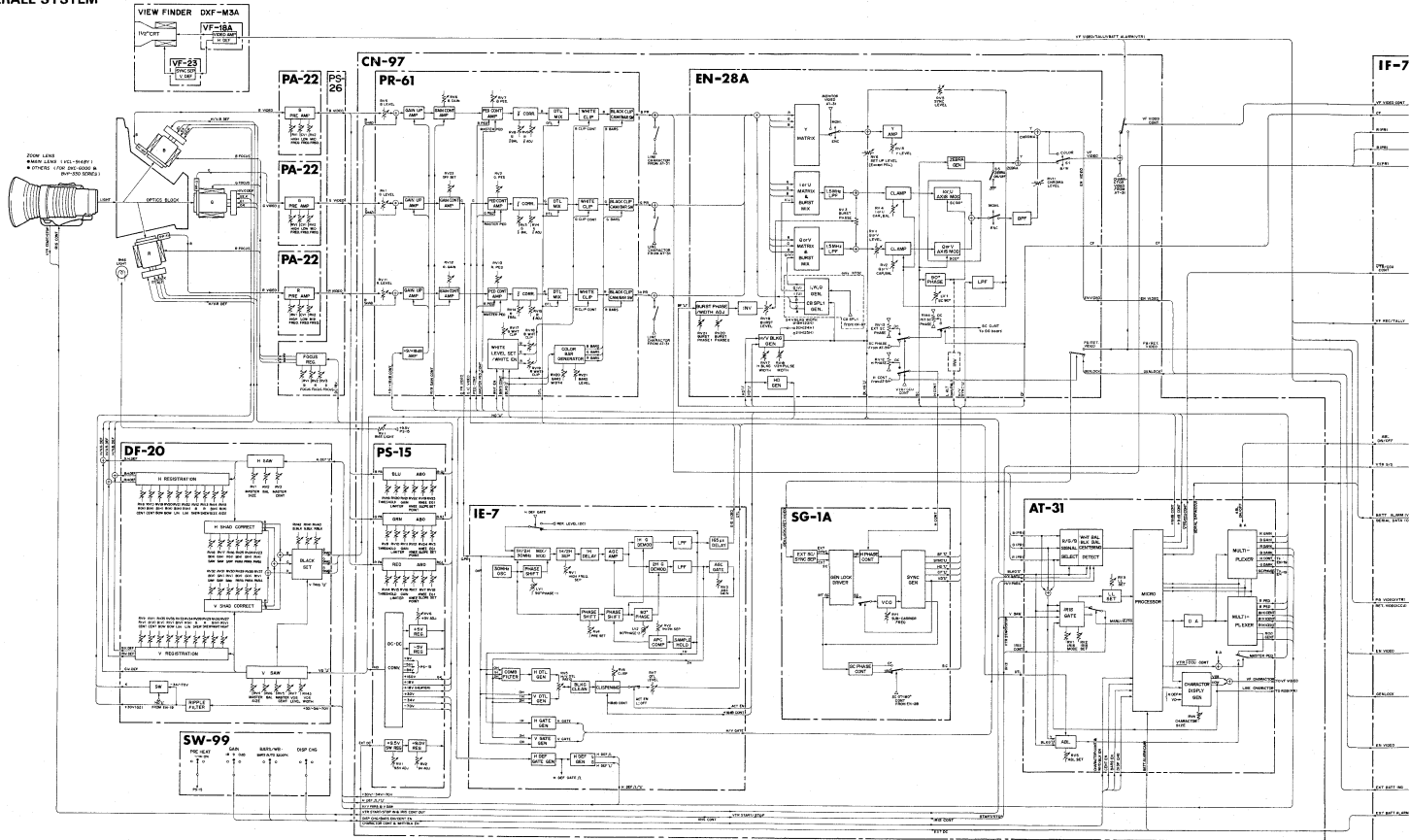


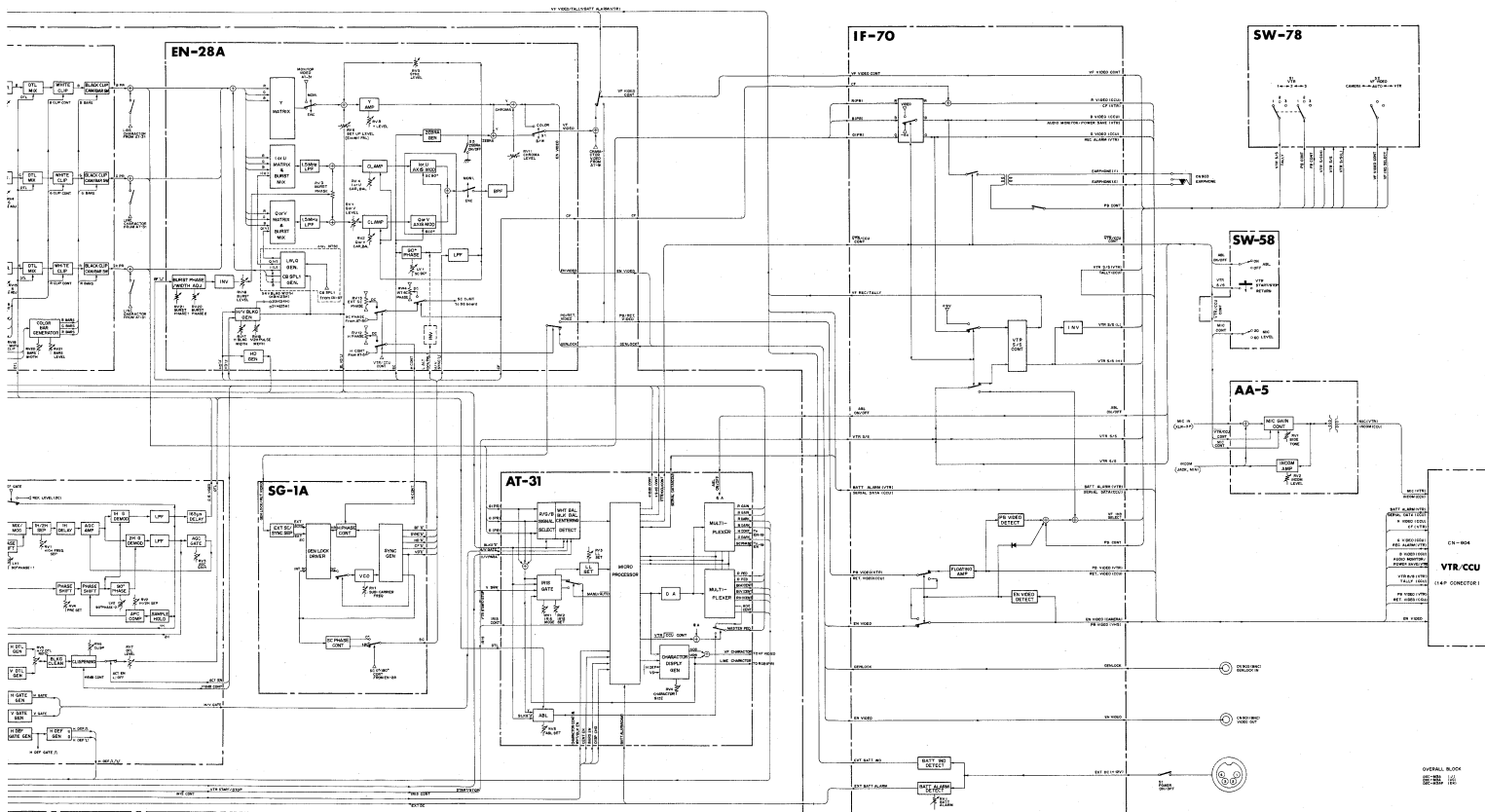


## SECTION 5

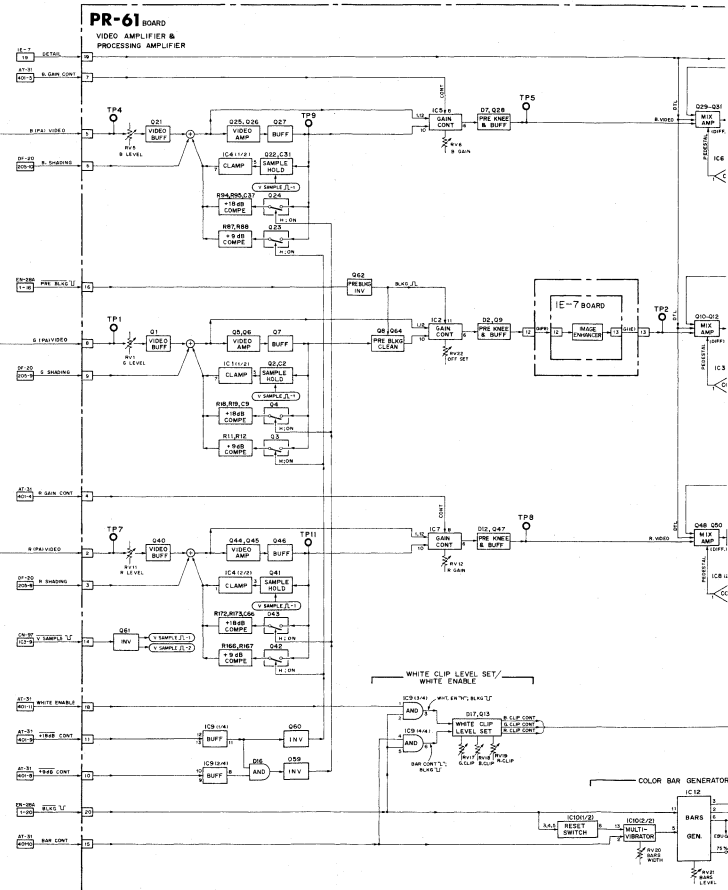
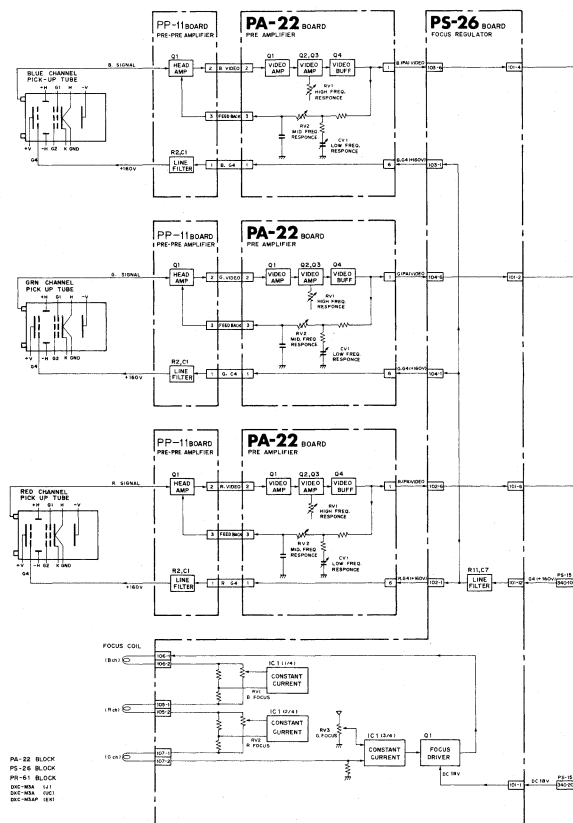
### DIAGRAM

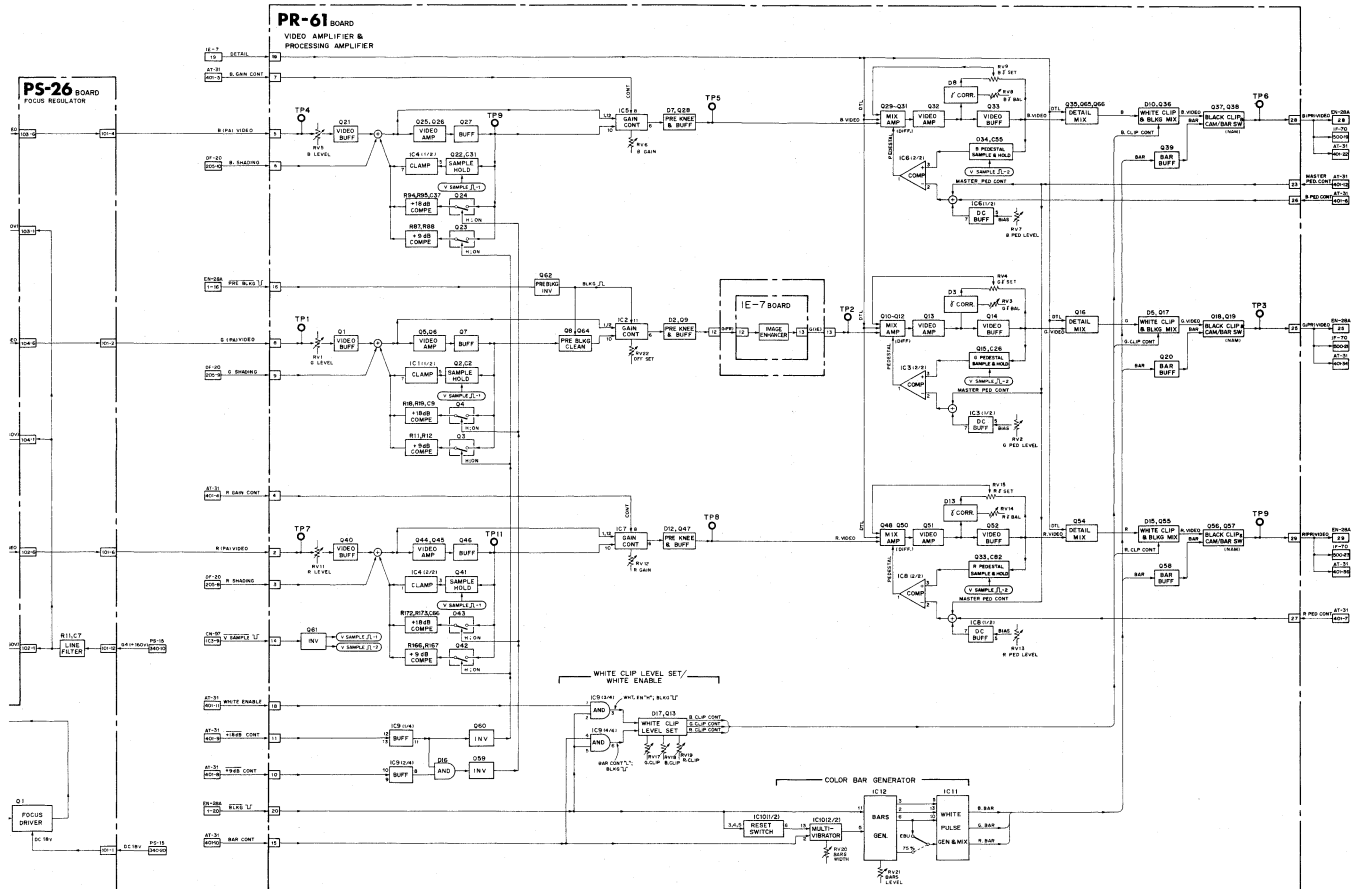
### 5-1. BLOCK DIAGRAM OVERALL SYSTEM





PA-22 BOARD  
PS-26 BOARD  
PR-61 BOARD



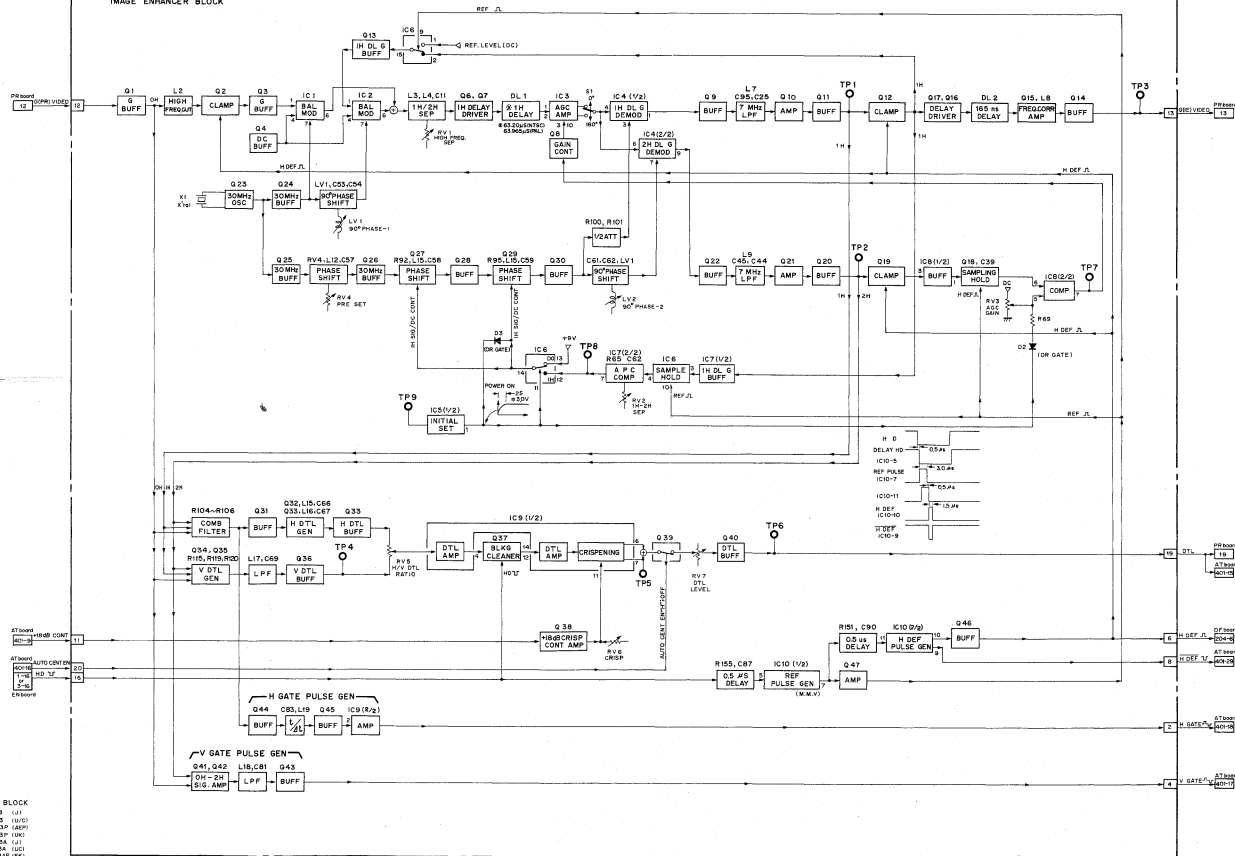


**EN-28A** BOARD  
ENCODER  
BLKG PULSE GENERATOR  
GENLOCK/CCU REMOTE SYSTEM



IE-7 BOARD

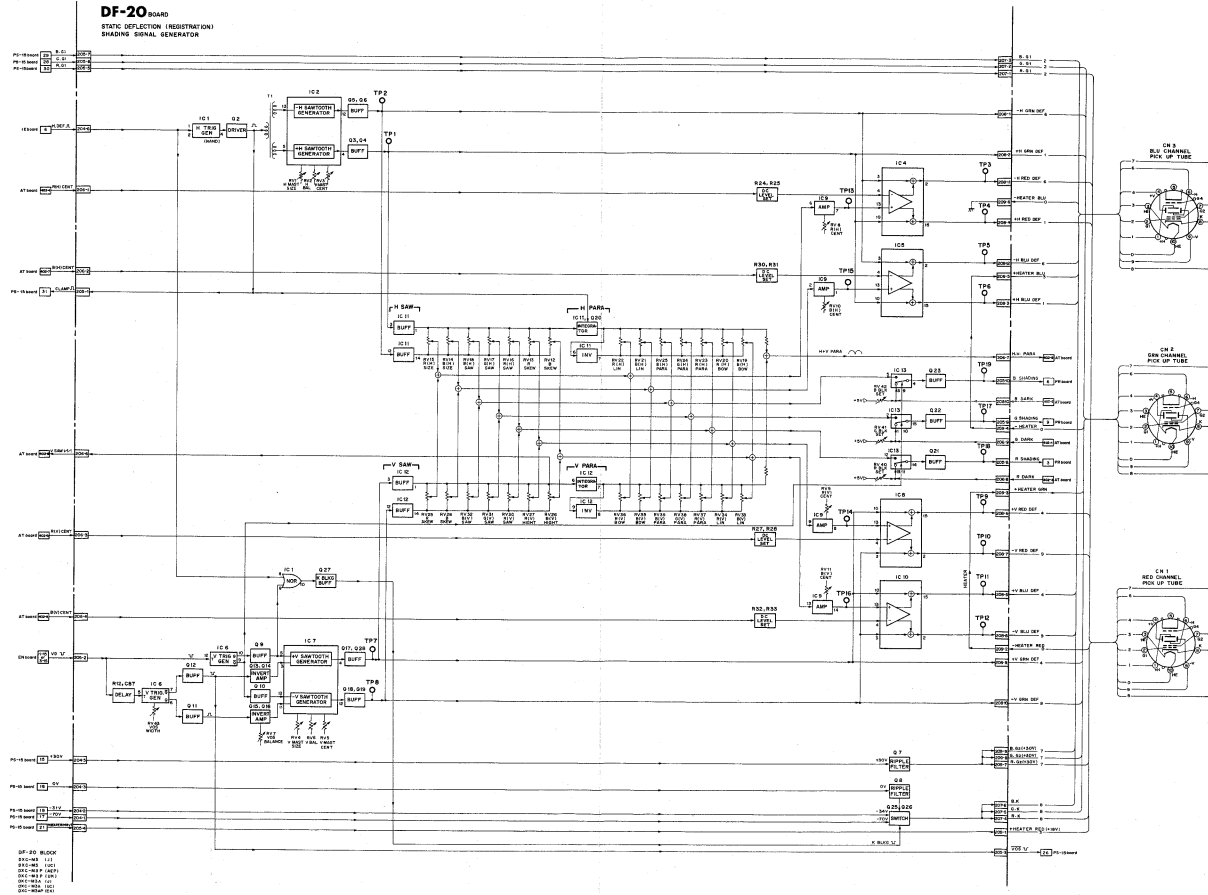
**IE-7** BOARD  
IMAGE ENHANCER BLOCK



IE-7 BLOCK  
DNC-W3 (L1)  
DNC-W3 (R10C1)  
DNC-W3 (R10C2)  
DNC-W3 (R10C3)  
DNC-W3 (R10C4)  
DNC-W3 (R10C5)  
DNC-W3 (R10C6)  
DNC-W3 (R10C7)  
DNC-W3 (R10C8)  
DNC-W3 (R10C9)  
DNC-W3 (R10C10)

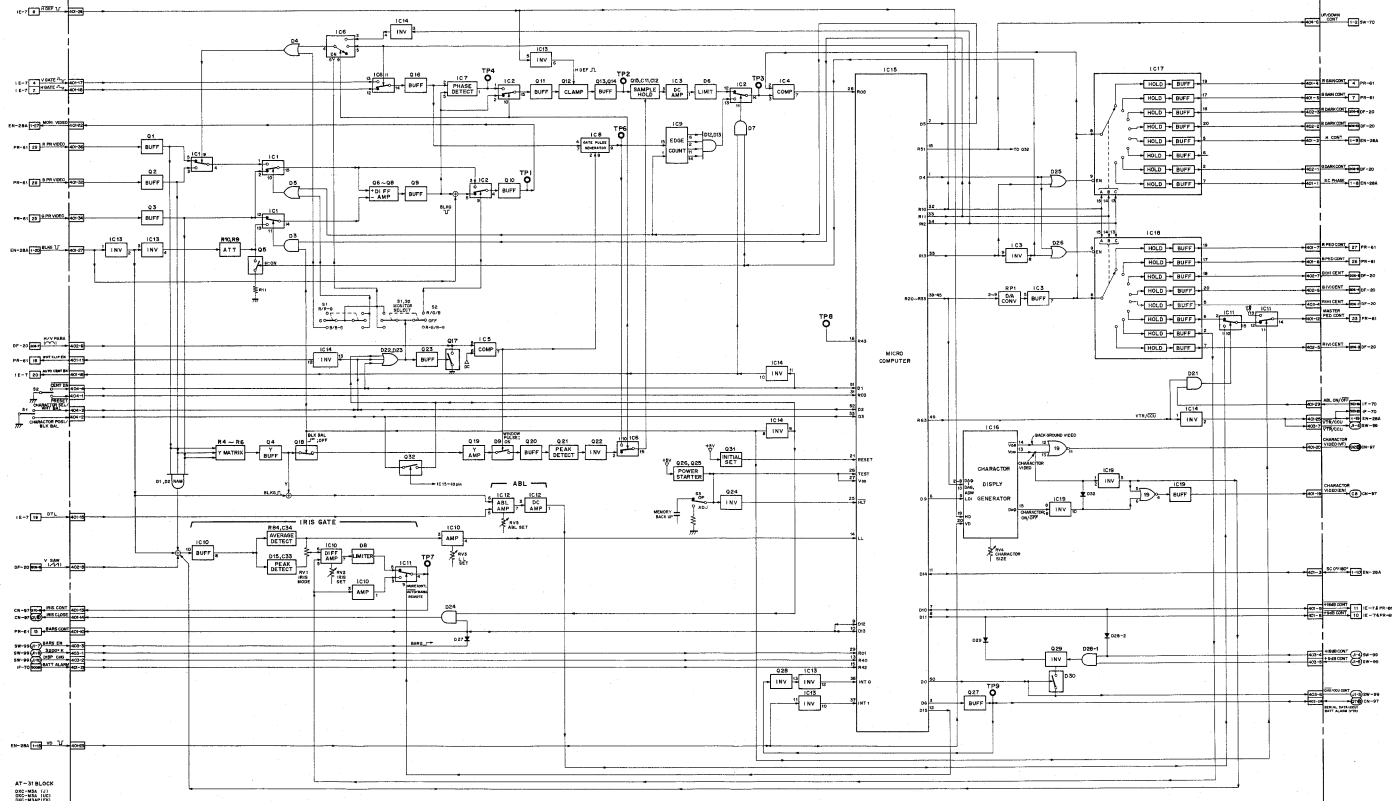
## DF-20 B/D

**DF-20** BOARD  
STATIC DEFLECTION (REGISTRATION)  
SHADING SIGNAL GENERATOR



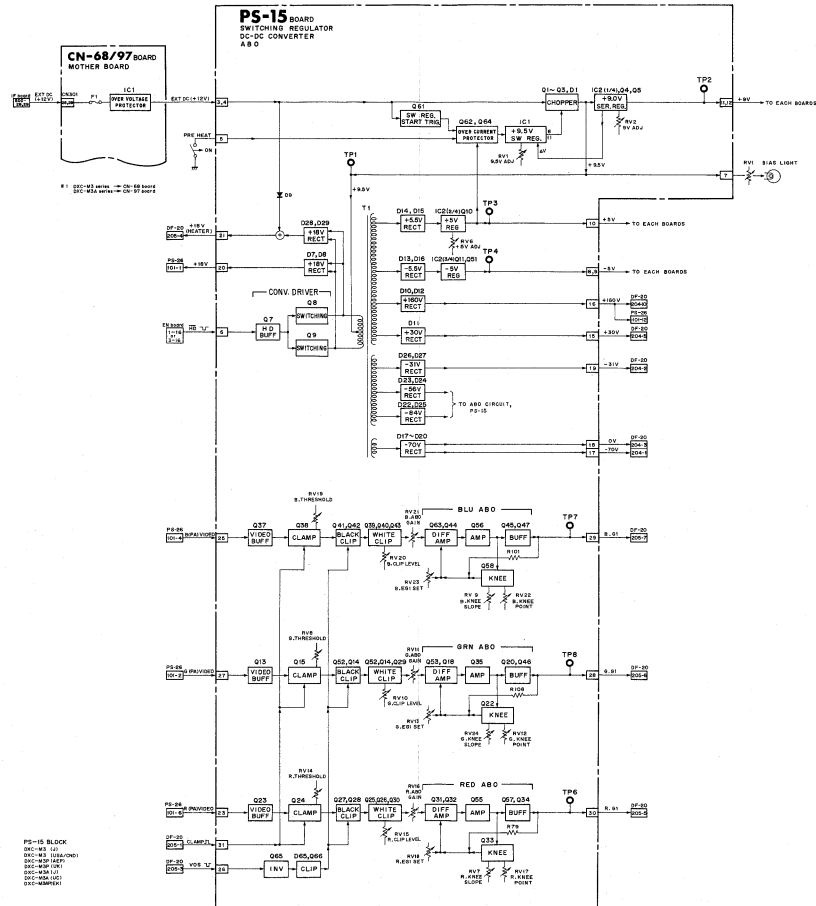
AT-31 BOARD

**AT-31 BOARD**  
 AUTO WHITE/BLACK BALANCE  
 AUTO CENTERING  
 AUTO GAIN CONTROL  
 V.F. CHARACTER DISPLAY GENERATOR  
 VIRTUCCU CONTROL





## PS-15 BOARD



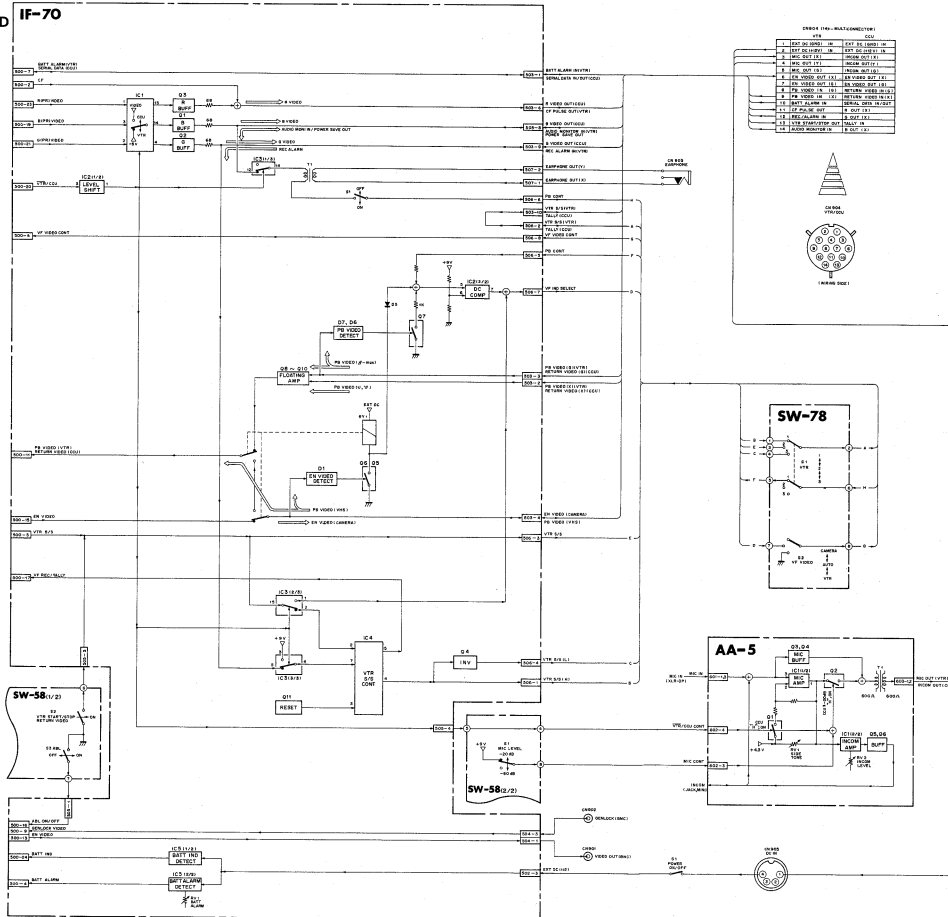
**SG-1A BOARD**



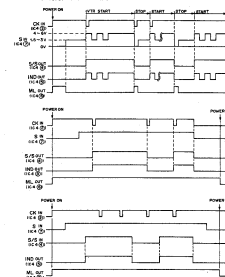
## IF-70 B/D IF-70 B/D

## IF-70 BOARD

## IF-70



IC 4 (CX51.0) TIMING CHART

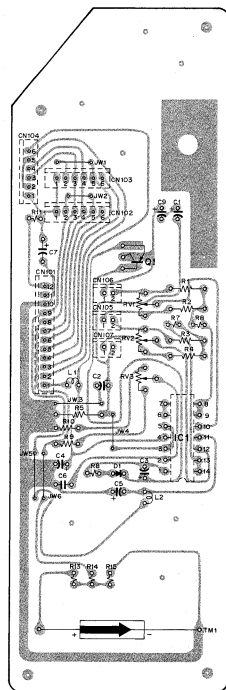


INTERFACE FRAME BLOCK  
 EDC=MSA 121  
 EDC=MSA 120  
 EDC=MSA 120

## 5-2. MOUNTED CIRCUIT BOARD AND SCHEMATIC DIAGRAM

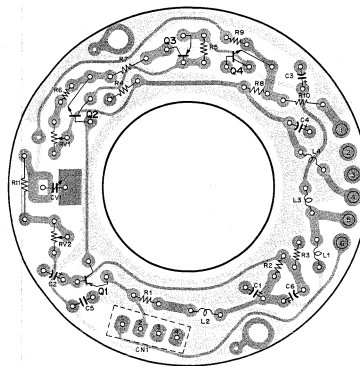
## PA-22 BOARD (PRE AMP)

## PS-26 BOARD (FOCUS REGULATOR)



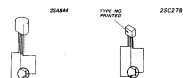
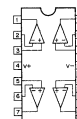
-SOLDERING SIDE-

## PS-26 BOARD

1-610-094-13  
DSC-M3A (UC-1)  
DSC-M3AP (EX-1)

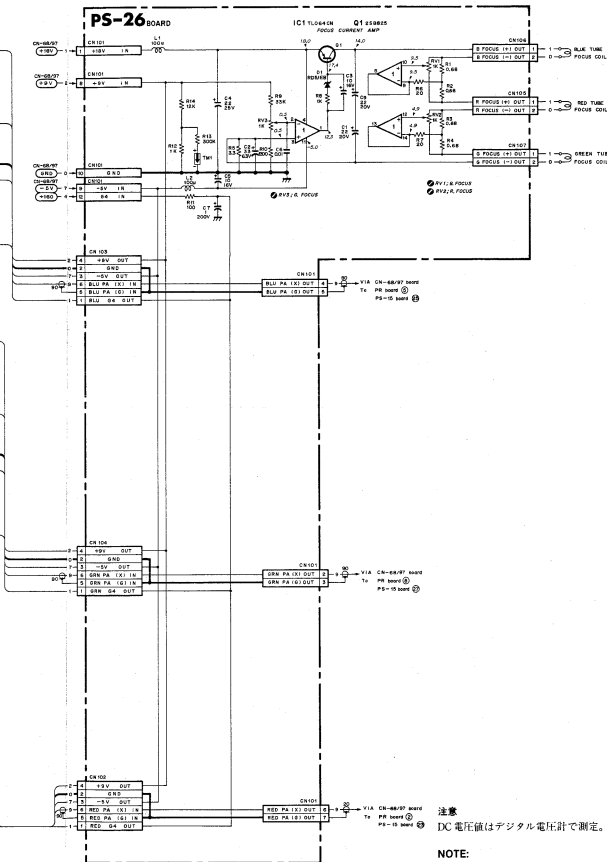
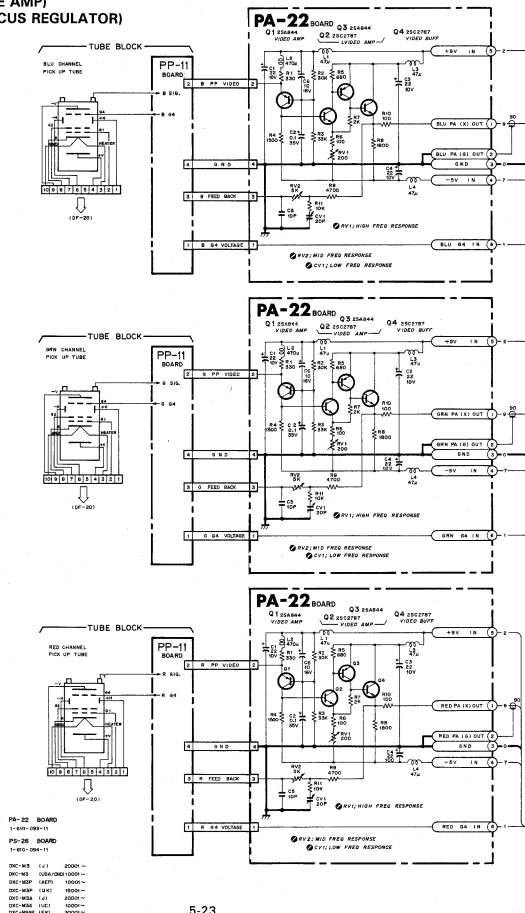
-SOLDERING SIDE-

## PA-22 BOARD

1-810-093-11  
DSC-M3A (UC-1)  
DSC-M3AP (EX-1)TLO84CNS (T1)  
OPERATIONAL AMPLIFIER  
1/2 FET-INPUT

**PA-22,PS-26**

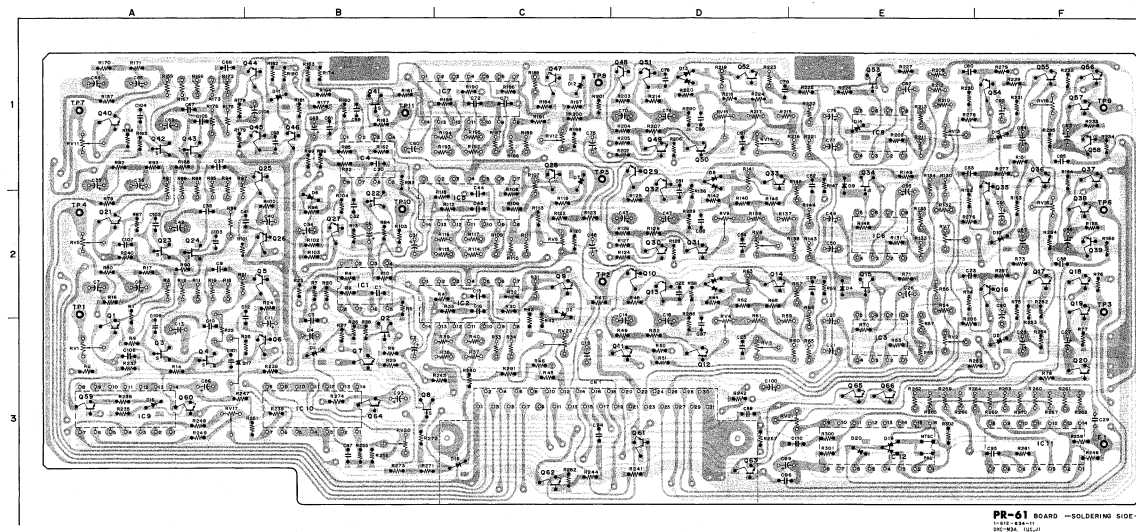
PA-22 BOARD (PRE AMP)  
PS-26 BOARD (FOCUS REGULATOR)



注意  
DC 電圧値はデジタル電圧計で測定。

**NOTE:**  
All voltage are measured with a digital voltmeter (input resistance 10M $\Omega$ ).

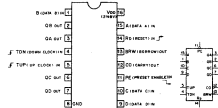
PR-61 BOARD (PROCESS)



PR-61 BOARD —SOLDERING SIDE—  
[REVERSE SIDE]

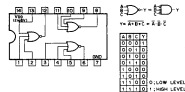
CN1	G-3	G32	D-1
D1	B-3	G33	D-1
D2	D-2	G34	E-1
D3	D-2	G35	F-1
D4	E-2	G36	F-1
D5	F-2	G37	F-2
D6	F-2	G38	F-2
D7	C-1	G39	A-1
D8	F-2	G40	A-1
D9	E-1	G41	A-1
D10	F-2	G42	A-1
D11	B-1	G43	B-1
D12	C-1	G44	B-1
D13	D-1	G45	B-1
D14	E-1	G46	B-1
D15	F-1	G47	D-1
D16	A-3	G48	D-1
D17	A-3	G49	D-1
D18	C-3	G50	D-1
D19	E-3	G51	D-1
D20	E-3	G52	E-1
E1	F-3	G53	E-1
IC1	B-2	G54	F-1
IC2	C-2	G55	F-1
IC3	E-3	G56	F-1
IC4	B-1	G57	F-1
IC5	C-2	G58	A-3
IC6	E-2	G59	A-3
IC7	C-1	G60	D-3
IC8	E-1	G61	D-3
IC9	B-3	G62	D-3
IC10	B-3	G63	E-3
IC11	F-3	G64	E-3
IC12	E-3	G65	F-1
Q1	A-3	RV1	A-3
Q2	B-3	RV2	D-3
Q3	A-3	RV3	D-3
Q4	A-3	RV4	D-3
Q5	B-2	RV5	E-2
Q6	B-3	RV6	E-2
Q7	B-3	RV7	E-2
Q8	B-3	RV8	E-2
Q9	C-2	RV9	E-1
Q10	C-2	RV10	E-1
Q11	D-3	RV11	E-1
Q12	D-3	RV12	E-1
Q13	D-2	RV13	D-1
Q14	D-2	RV14	D-1
Q15	E-2	RV15	F-2
Q16	F-2	RV16	F-2
Q17	F-2	RV17	F-2
Q18	F-2	RV18	F-2
Q19	F-2	RV19	F-2
Q20	F-2	RV20	F-2
Q21	A-2	RV21	F-2
Q22	B-2	RV22	C-3
Q23	C-2	TP1	A-2
Q24	C-2	TP2	C-2
Q25	B-1	TP3	A-2
Q26	B-1	TP4	A-2
Q27	B-2	TP5	F-2
Q28	B-1	TP6	F-2
Q29	D-1	TP7	F-1
Q30	D-2	TP8	C-1
Q31	D-2	TP9	F-1
		TP10	B-2
		TP11	B-1

TA00001P (TOSHIBA)  
CLOCK PRESETTABLE SYNCHRONOUS 4-BIT UP/DOWN COUNTER  
—TOP VIEW—



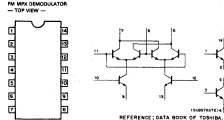
FUNCTION	SYMBOL	WIDE
CLOCK	1	1
PRESET	2	2
CLEAR	3	3
Q0	4	4
Q1	5	5
Q2	6	6
Q3	7	7
Q0	8	8
Q1	9	9
Q2	10	10
Q3	11	11
Q0	12	12
Q1	13	13
Q2	14	14
Q3	15	15

TA00002P (TOSHIBA)  
CLOCK INPUT POSITIVE EDGE TRIGGER  
—TOP VIEW—



FUNCTION	SYMBOL	WIDE
CLOCK	1	1
PRESET	2	2
CLEAR	3	3
Q0	4	4
Q1	5	5
Q2	6	6
Q3	7	7
Q0	8	8
Q1	9	9
Q2	10	10
Q3	11	11
Q0	12	12
Q1	13	13
Q2	14	14
Q3	15	15

TA00003P (TOSHIBA)  
DUAL INDEPENDENT DIFFERENTIAL AMPLIFIER  
AND/OR INVERTER  
—TOP VIEW—



FUNCTION	SYMBOL	WIDE
INVERTER	1	1
DIFFERENTIAL AMPLIFIER	2	2
Q0	3	3
Q1	4	4
Q2	5	5
Q3	6	6
Q0	7	7
Q1	8	8
Q2	9	9
Q3	10	10
Q0	11	11
Q1	12	12
Q2	13	13
Q3	14	14
Q0	15	15

TOP VIEW



TOP VIEW



TOP VIEW

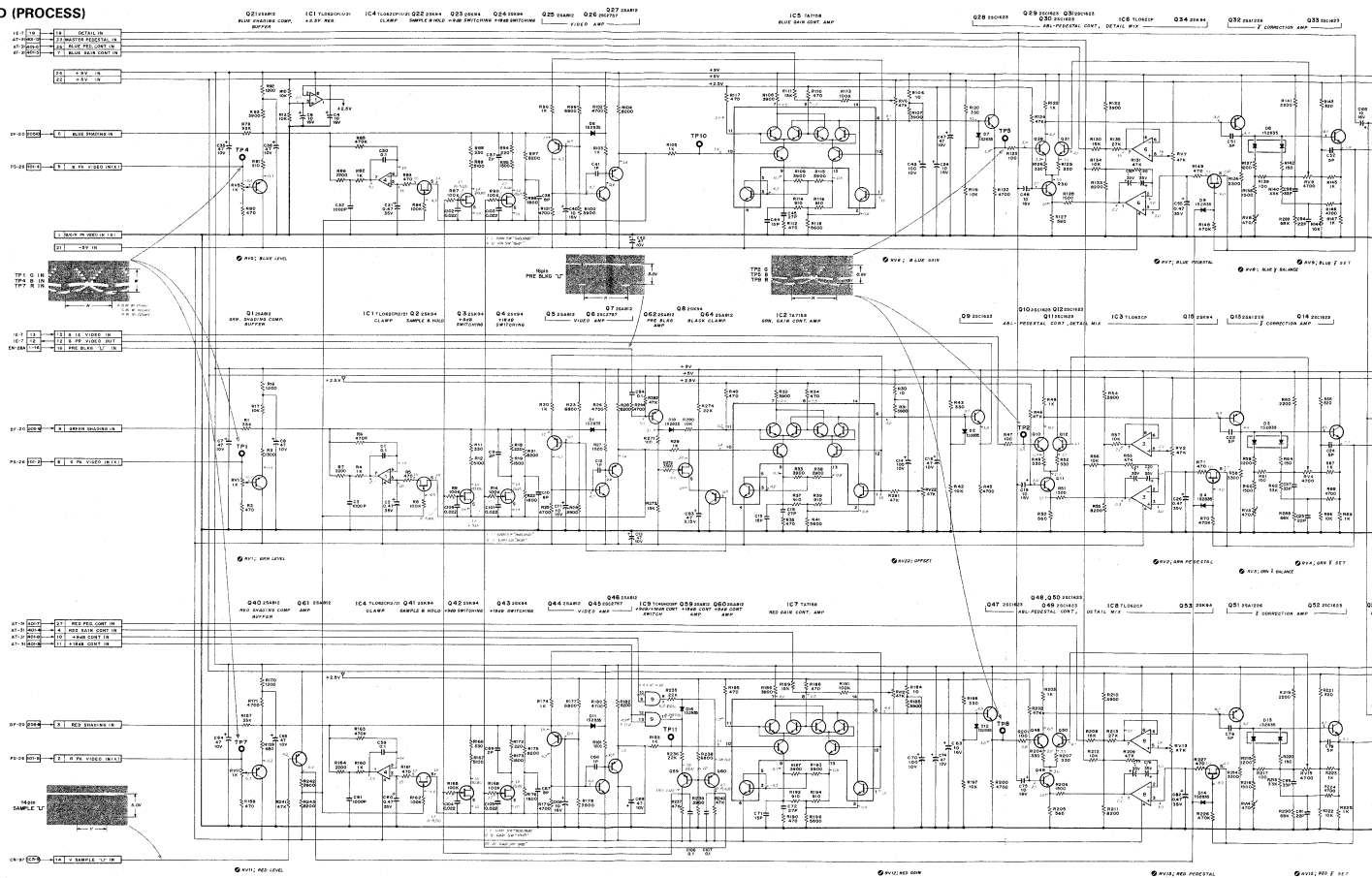


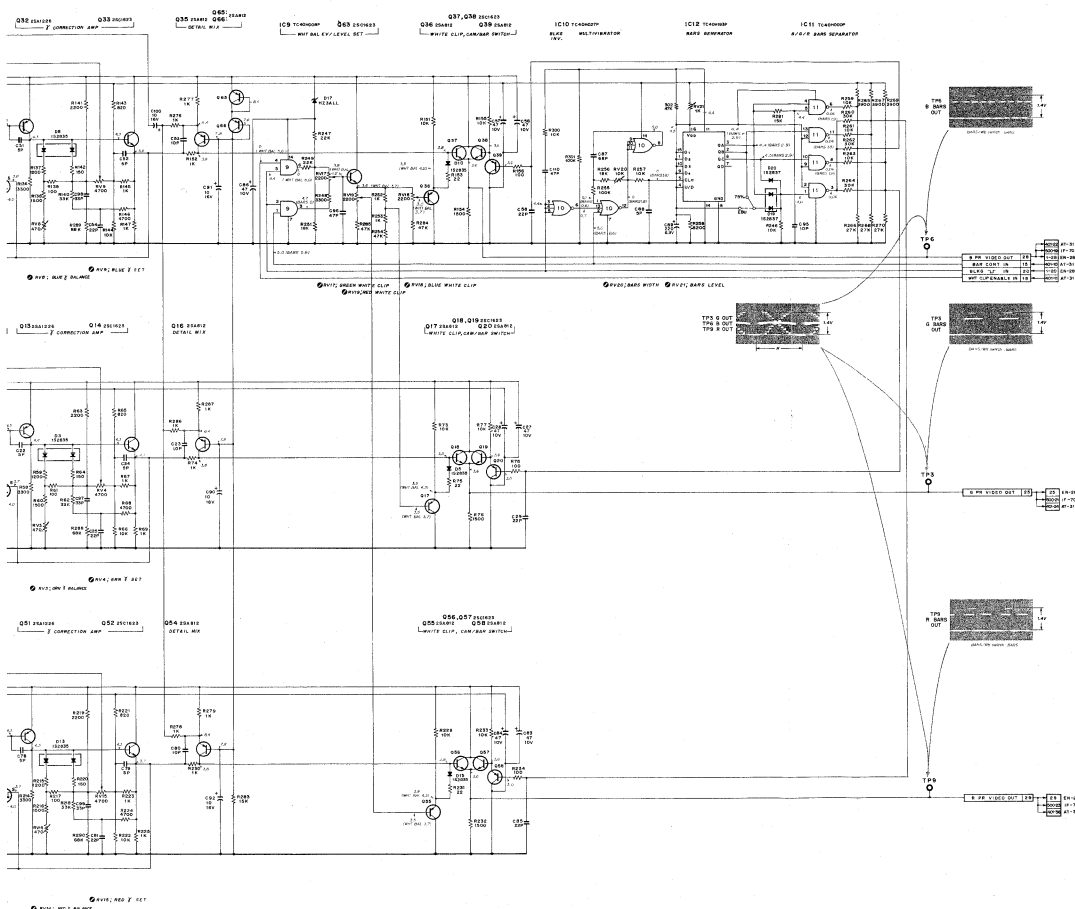
TA00004P (TOSHIBA)  
CLOCK INPUT POSITIVE EDGE TRIGGER  
—TOP VIEW—



FUNCTION	SYMBOL	WIDE
CLOCK	1	1
PRESET	2	2
CLEAR	3	3
Q0	4	4
Q1	5	5
Q2	6	6
Q3	7	7
Q0	8	8
Q1	9	9
Q2	10	10
Q3	11	11
Q0	12	12
Q1	13	13
Q2	14	14
Q3	15	15

## PR-61 BOARD (PROCESS)





## 注意

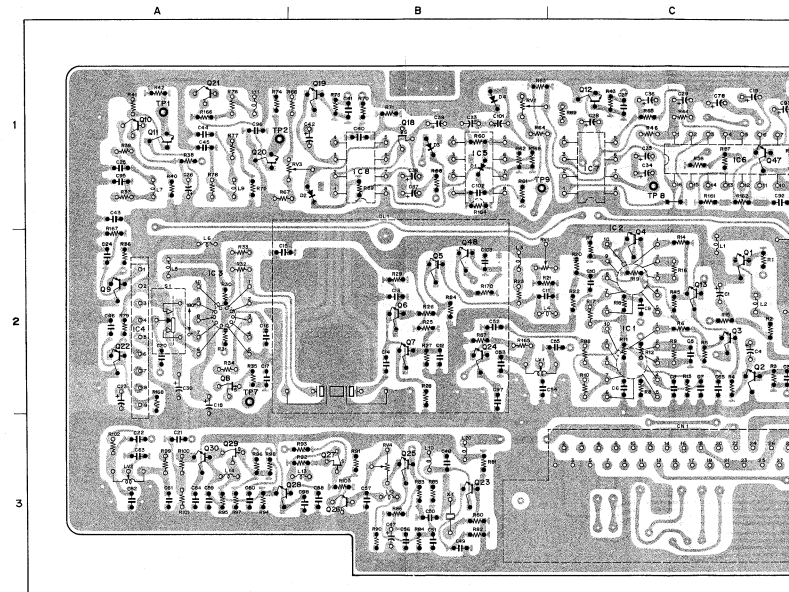
- DC 電圧はデジタル電圧計による値。
- 波影写真は下記条件で撮影。
  - PR-61 基板、TP1 にてグレースケールの白部分が 400mV<sub>p-p</sub> になる様レンズアイリスをセットする。  
(F<sub>4</sub>、波影モニターで 100IRE)。
  - BARS/WB スイッチ→3200°K 位置
  - GAIN スイッチ→0dB 位置
  - フィルターディスター"1"

## NOTE:

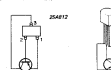
- All voltage are dc, measured with a digital volt meter (input resistance 10MQ).
- All wave forms are taken in conditions below.
  - Shoot the gray scale pattern on the pattern box.  
Adjust lens iris so that a white level at TP1/PR-61 board is 400 mV. (F=4, White level on the waveform monitor is 100 IRE)
  - Set camera GAIN switch to 0 dB position.
  - Set camera BARS/WB switch to 3200°K position.



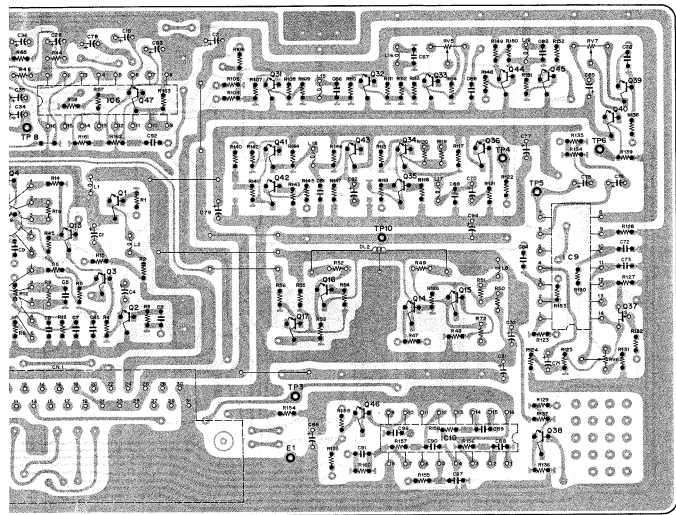
## IE-7 BOARD (IMAGE ENHANCER)



TOP VIEW (SCALE 4:1)

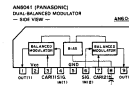


C D E

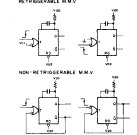
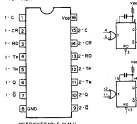


—SOLDERING SIDE—  
**IE-7 BOARD**  
 1-100-400-10  
 01E-70A 1E-71

- |      |     |      |     |
|------|-----|------|-----|
| DN1  | C-3 | Q38  | E-3 |
| D1   | B-1 | Q39  | E-1 |
| D2   | B-1 | Q40  | E-1 |
| D3   | B-1 | Q41  | D-2 |
| D4   | B-1 | Q42  | D-2 |
|      |     | Q43  | D-1 |
| DL1  | B-2 | Q44  | E-1 |
| DL2  | D-2 | Q45  | E-1 |
|      |     | Q46  | D-3 |
| E1   | D-3 | Q47  | C-1 |
|      |     | Q48  | B-2 |
| IC1  | C-2 | RV1  | B-2 |
| IC2  | C-2 | RV2  | B-1 |
| IC3  | A-2 | RV3  | B-1 |
| IC4  | A-2 | RV4  | B-3 |
| IC5  | B-1 | RV5  | E-1 |
| IC6  | B-1 | RV6  | E-3 |
| IC7  | C-1 | RV7  | E-1 |
| IC8  | B-1 |      |     |
| IC9  | E-2 | S1   | A-2 |
| IC10 | E-3 |      |     |
| LV1  | B-2 | TP1  | A-1 |
| LV2  | A-3 | TP2  | A-1 |
|      |     | TP3  | D-3 |
|      |     | TP4  | E-1 |
| Q1   | C-2 | TP5  | E-2 |
| Q2   | C-2 | TP6  | E-1 |
| Q3   | C-2 | TP7  | A-2 |
| Q4   | C-2 | TP8  | C-1 |
| Q5   | B-2 | TP9  | B-1 |
| Q6   | B-2 | TP10 | D-2 |
| Q7   | B-2 |      |     |
| Q8   | B-2 | X1   | B-3 |
| Q10  | A-1 |      |     |
| Q11  | A-1 |      |     |
| Q12  | C-1 |      |     |
| Q13  | E-2 |      |     |
| Q14  | D-2 |      |     |
| Q15  | D-2 |      |     |
| Q16  | D-2 |      |     |
| Q17  | D-2 |      |     |
| Q18  | B-1 |      |     |
| Q19  | B-1 |      |     |
| Q20  | A-1 |      |     |
| Q21  | B-1 |      |     |
| Q22  | A-2 |      |     |
| Q23  | B-2 |      |     |
| Q24  | B-2 |      |     |
| Q25  | B-3 |      |     |
| Q26  | B-3 |      |     |
| Q27  | B-3 |      |     |
| Q28  | A-3 |      |     |
| Q29  | A-3 |      |     |
| Q30  | A-3 |      |     |
| Q31  | D-1 |      |     |
| Q32  | D-1 |      |     |
| Q33  | E-1 |      |     |
| Q34  | D-1 |      |     |
| Q35  | D-2 |      |     |
| Q36  | E-1 |      |     |
| Q37  | E-2 |      |     |



CC4058BP (TOSHIBA)  
 C-MOS QUAD INVERTER/NOT-RETAINABLE  
 —TOP VIEW—

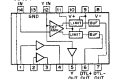


NON-RETAINABLE M-W

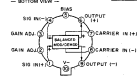
CARD (507)

DEL. AMPLIFIER

—TOP VIEW—



MC4558P (MOTOROLA)  
 BI-MOS DIFFERENTIAL VIDEO AMPLIFIER  
 —BOTTOM VIEW—



BLU2000 (LMS)

OPERATIONAL AMPLIFIER

—TOP VIEW—



TC4058BP (TOSHIBA)

C-MOS QUAD INVERTER/NOT-RETAINABLE

—TOP VIEW—



Pin	Symbol	Function
1	V <sub>CC</sub>	Power Supply
2	V <sub>CC</sub>	Power Supply
3	V <sub>CC</sub>	Power Supply
4	V <sub>CC</sub>	Power Supply
5	V <sub>CC</sub>	Power Supply
6	V <sub>CC</sub>	Power Supply
7	V <sub>CC</sub>	Power Supply
8	V <sub>CC</sub>	Power Supply
9	V <sub>CC</sub>	Power Supply
10	V <sub>CC</sub>	Power Supply
11	V <sub>CC</sub>	Power Supply
12	V <sub>CC</sub>	Power Supply
13	V <sub>CC</sub>	Power Supply
14	V <sub>CC</sub>	Power Supply
15	V <sub>CC</sub>	Power Supply
16	V <sub>CC</sub>	Power Supply
17	V <sub>CC</sub>	Power Supply
18	V <sub>CC</sub>	Power Supply
19	V <sub>CC</sub>	Power Supply
20	V <sub>CC</sub>	Power Supply
21	V <sub>CC</sub>	Power Supply
22	V <sub>CC</sub>	Power Supply
23	V <sub>CC</sub>	Power Supply
24	V <sub>CC</sub>	Power Supply
25	V <sub>CC</sub>	Power Supply
26	V <sub>CC</sub>	Power Supply
27	V <sub>CC</sub>	Power Supply
28	V <sub>CC</sub>	Power Supply
29	V <sub>CC</sub>	Power Supply
30	V <sub>CC</sub>	Power Supply
31	V <sub>CC</sub>	Power Supply
32	V <sub>CC</sub>	Power Supply
33	V <sub>CC</sub>	Power Supply
34	V <sub>CC</sub>	Power Supply
35	V <sub>CC</sub>	Power Supply
36	V <sub>CC</sub>	Power Supply
37	V <sub>CC</sub>	Power Supply
38	V <sub>CC</sub>	Power Supply
39	V <sub>CC</sub>	Power Supply
40	V <sub>CC</sub>	Power Supply
41	V <sub>CC</sub>	Power Supply
42	V <sub>CC</sub>	Power Supply
43	V <sub>CC</sub>	Power Supply
44	V <sub>CC</sub>	Power Supply
45	V <sub>CC</sub>	Power Supply
46	V <sub>CC</sub>	Power Supply
47	V <sub>CC</sub>	Power Supply
48	V <sub>CC</sub>	Power Supply
49	V <sub>CC</sub>	Power Supply
50	V <sub>CC</sub>	Power Supply
51	V <sub>CC</sub>	Power Supply
52	V <sub>CC</sub>	Power Supply
53	V <sub>CC</sub>	Power Supply
54	V <sub>CC</sub>	Power Supply
55	V <sub>CC</sub>	Power Supply
56	V <sub>CC</sub>	Power Supply
57	V <sub>CC</sub>	Power Supply
58	V <sub>CC</sub>	Power Supply
59	V <sub>CC</sub>	Power Supply
60	V <sub>CC</sub>	Power Supply
61	V <sub>CC</sub>	Power Supply
62	V <sub>CC</sub>	Power Supply
63	V <sub>CC</sub>	Power Supply
64	V <sub>CC</sub>	Power Supply
65	V <sub>CC</sub>	Power Supply
66	V <sub>CC</sub>	Power Supply
67	V <sub>CC</sub>	Power Supply
68	V <sub>CC</sub>	Power Supply
69	V <sub>CC</sub>	Power Supply
70	V <sub>CC</sub>	Power Supply
71	V <sub>CC</sub>	Power Supply
72	V <sub>CC</sub>	Power Supply
73	V <sub>CC</sub>	Power Supply
74	V <sub>CC</sub>	Power Supply
75	V <sub>CC</sub>	Power Supply
76	V <sub>CC</sub>	Power Supply
77	V <sub>CC</sub>	Power Supply
78	V <sub>CC</sub>	Power Supply
79	V <sub>CC</sub>	Power Supply
80	V <sub>CC</sub>	Power Supply
81	V <sub>CC</sub>	Power Supply
82	V <sub>CC</sub>	Power Supply
83	V <sub>CC</sub>	Power Supply
84	V <sub>CC</sub>	Power Supply
85	V <sub>CC</sub>	Power Supply
86	V <sub>CC</sub>	Power Supply
87	V <sub>CC</sub>	Power Supply
88	V <sub>CC</sub>	Power Supply
89	V <sub>CC</sub>	Power Supply
90	V <sub>CC</sub>	Power Supply
91	V <sub>CC</sub>	Power Supply
92	V <sub>CC</sub>	Power Supply
93	V <sub>CC</sub>	Power Supply
94	V <sub>CC</sub>	Power Supply
95	V <sub>CC</sub>	Power Supply
96	V <sub>CC</sub>	Power Supply
97	V <sub>CC</sub>	Power Supply
98	V <sub>CC</sub>	Power Supply
99	V <sub>CC</sub>	Power Supply
100	V <sub>CC</sub>	Power Supply

TL082C (TI)

OPERATIONAL AMPLIFIER

—TOP VIEW—



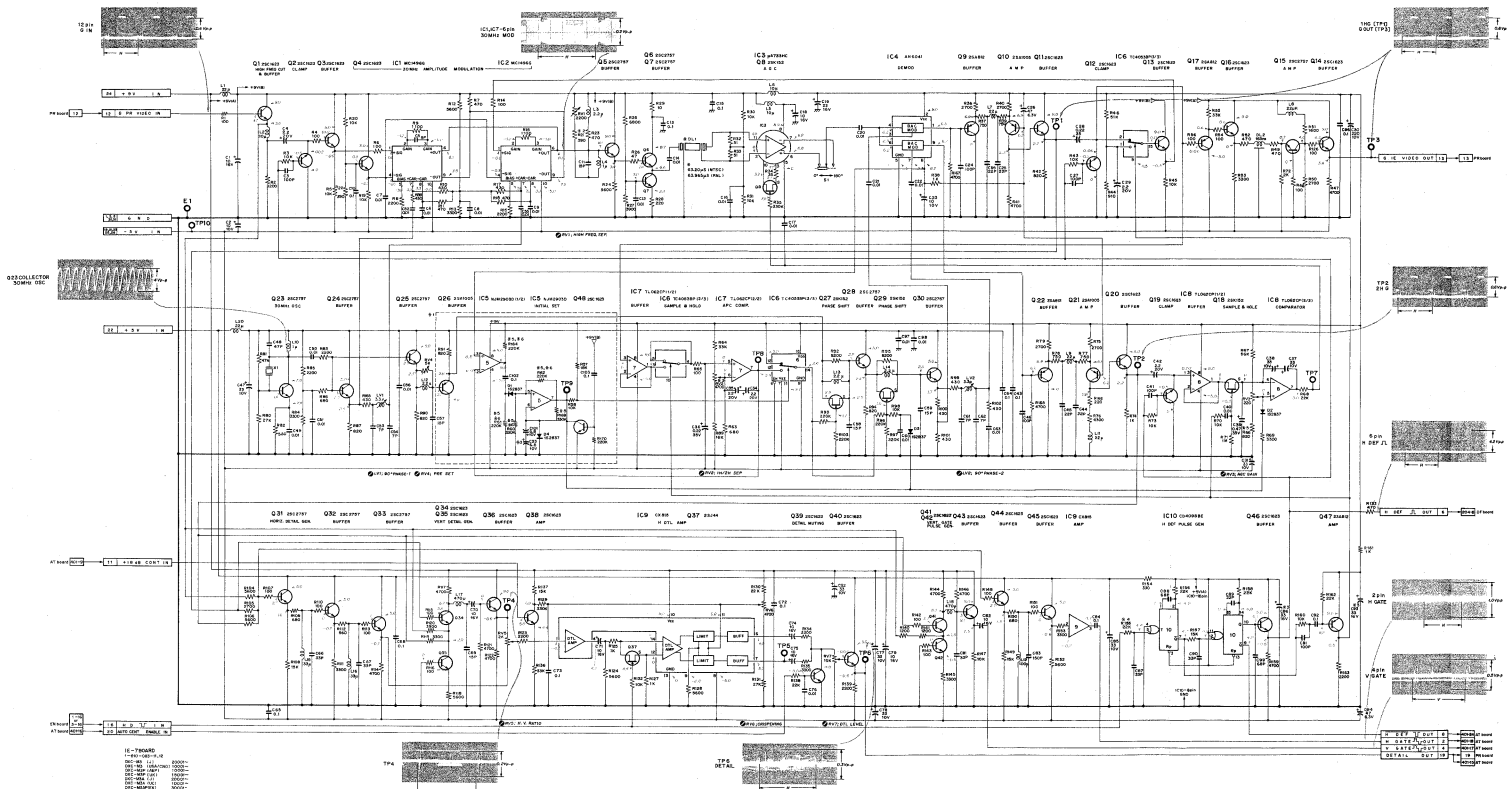
AT80C86 (Intel)

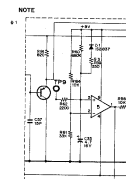
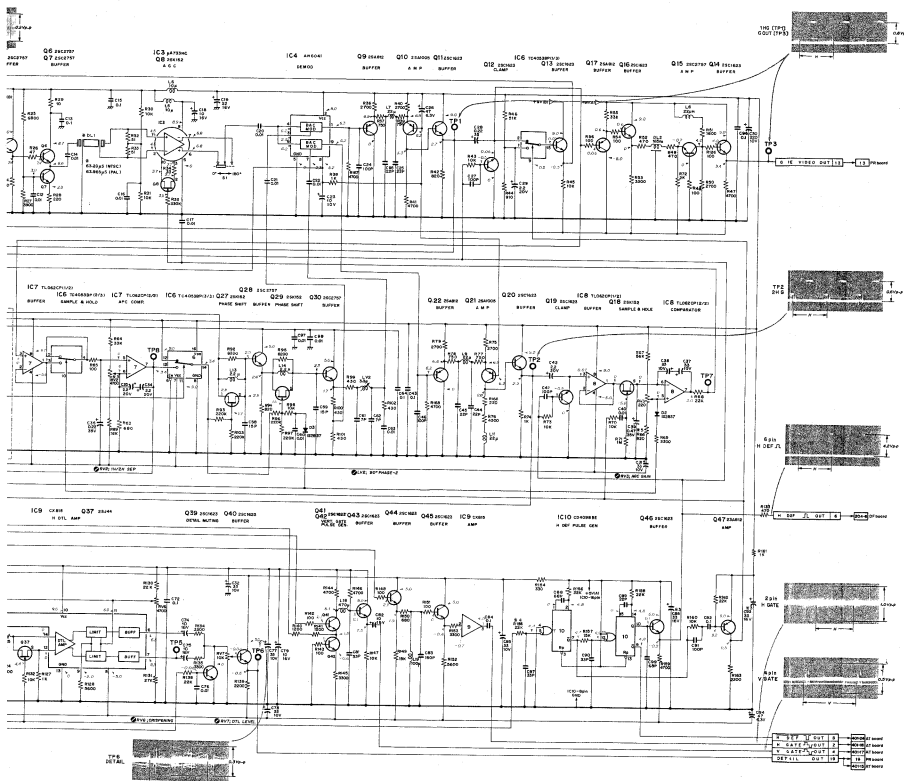
DIFFERENTIAL VIDEO AMPLIFIER

—BOTTOM VIEW—



### E-7 BOARD (IMAGE ENHANCER)





IC	Part Number	Manufacturer	Notes
IC1	74LS00	ON	
IC2	74LS00	ON	
IC3	74LS00	ON	
IC4	74LS00	ON	
IC5	74LS00	ON	
IC6	74LS00	ON	
IC7	74LS00	ON	
IC8	74LS00	ON	
IC9	74LS00	ON	
IC10	74LS00	ON	
IC11	74LS00	ON	
IC12	74LS00	ON	
IC13	74LS00	ON	
IC14	74LS00	ON	
IC15	74LS00	ON	
IC16	74LS00	ON	
IC17	74LS00	ON	
IC18	74LS00	ON	
IC19	74LS00	ON	
IC20	74LS00	ON	
IC21	74LS00	ON	
IC22	74LS00	ON	
IC23	74LS00	ON	
IC24	74LS00	ON	
IC25	74LS00	ON	
IC26	74LS00	ON	
IC27	74LS00	ON	
IC28	74LS00	ON	
IC29	74LS00	ON	
IC30	74LS00	ON	
IC31	74LS00	ON	
IC32	74LS00	ON	
IC33	74LS00	ON	
IC34	74LS00	ON	
IC35	74LS00	ON	
IC36	74LS00	ON	
IC37	74LS00	ON	
IC38	74LS00	ON	
IC39	74LS00	ON	
IC40	74LS00	ON	
IC41	74LS00	ON	
IC42	74LS00	ON	
IC43	74LS00	ON	
IC44	74LS00	ON	
IC45	74LS00	ON	
IC46	74LS00	ON	
IC47	74LS00	ON	
IC48	74LS00	ON	
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IC50	74LS00	ON	
IC51	74LS00	ON	
IC52	74LS00	ON	
IC53	74LS00	ON	
IC54	74LS00	ON	
IC55	74LS00	ON	
IC56	74LS00	ON	
IC57	74LS00	ON	
IC58	74LS00	ON	
IC59	74LS00	ON	
IC60	74LS00	ON	
IC61	74LS00	ON	
IC62	74LS00	ON	
IC63	74LS00	ON	
IC64	74LS00	ON	
IC65	74LS00	ON	
IC66	74LS00	ON	
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IC69	74LS00	ON	
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IC85	74LS00	ON	
IC86	74LS00	ON	
IC87	74LS00	ON	
IC88	74LS00	ON	
IC89	74LS00	ON	
IC90	74LS00	ON	
IC91	74LS00	ON	
IC92	74LS00	ON	
IC93	74LS00	ON	
IC94	74LS00	ON	
IC95	74LS00	ON	
IC96	74LS00	ON	
IC97	74LS00	ON	
IC98	74LS00	ON	
IC99	74LS00	ON	
IC100	74LS00	ON	

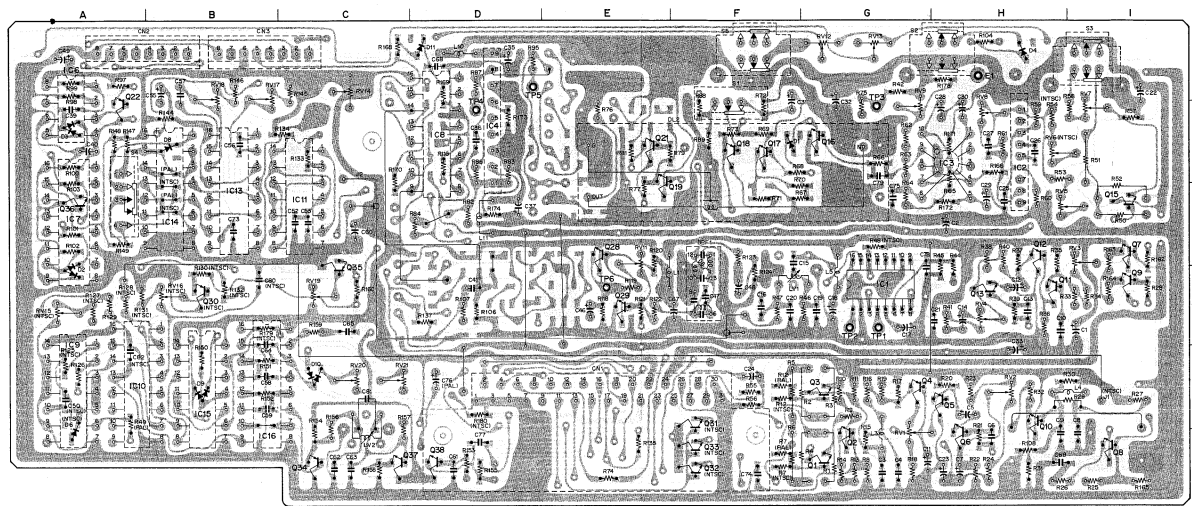
## 注意

- DC 電圧はデジタル電圧計による値。
- 波影写真は下記条件で撮影。
  - ホワイトウィンドウシートを張り、PR-61 基板の TP1 で白レベルが 400mVpp になる様レンズアリスをセットする (F $\gamma$ 4.0, 波影モニターで 100IRE)。
  - GAIN スイッチ→0dB 位置。
  - BARS/WB スイッチ→3200°K 位置。
  - フィルターディスク "1"。

## NOTE:

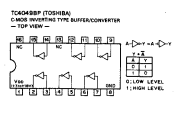
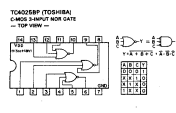
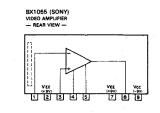
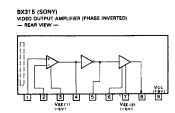
- All voltage are dc, measured with a digital volt meter (input resistance 10 M $\Omega$ ).
- All waveforms are taken in conditions below.
  - Shoot the white window pattern on the pattern box. Adjust lens iris so that a white level at TP1/PR-61 board is 400 mv. (F $\gamma$ 4, White level on the waveform monitor is 100 IRE)
  - Set camera GAIN switch to 0 dB position.
  - Set camera BARS/WB switch to 3200°K position.

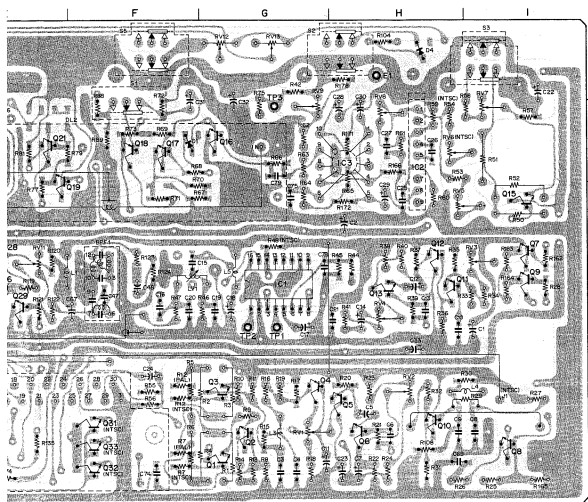
EN-28A BOARD (ENCODER)



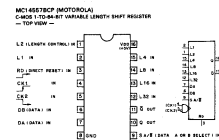
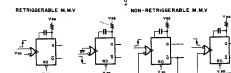
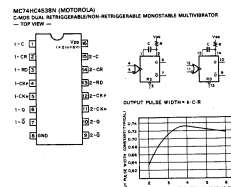
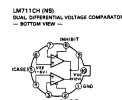
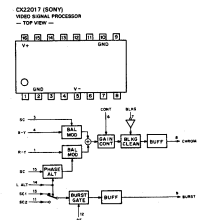
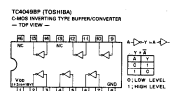
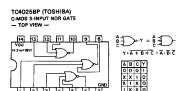
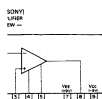
BPF1	F-4	IC1	G-4	Q3	G-5	Q30 (NTSC)	B-4	RV12	G-1	TP4	D-2
CN1	E-5	IC2	H-2	Q4	G-5	Q31 (NTSC)	F-5	RV13	G-1	TP5	D-1
CN2	A-1	IC3	H-2	Q5	H-5	Q32 (NTSC)	F-5	RV14	C-1	TP6	E-4
CN3	B-1	IC4	D-2	Q6	H-8	Q33 (NTSC)	F-6	RV15 (NTSC)	A-4		
		IC5	D-2	Q7	I-3	Q34	C-5	RV16 (NTSC)	B-4		
D1	F-2	IC6	D-2	Q8	I-6	Q35	C-4	RV17	B-1		
D2	A-4	IC7	D-2	Q9	I-4	Q36	A-3	RV18	B-1		
D3	A-2	IC8	A-5	Q10	H-5	Q37	C-6	RV19	C-4		
D4	H-1	IC9	C-3	Q11	H-4	Q38	D-6	RV20	C-5		
D5 (NTSC)	A-6	IC10	B-3	Q12	H-3	RV1	G-6	RV21	C-5		
D6	B-2	IC11	B-3	Q13	H-4	RV2	H-5	S1	F-2		
D7	B-5	IC14	B-3	Q15	I-3	RV3	I-3	S2	I-1		
D10	D-1	IC15	B-5	Q16	G-2	RV4	H-4	S3	I-1		
		IC16	B-5	Q17	F-2	RV5	I-3	S4	A-3		
DL2	F-2	LV1	F-4	Q18	E-2	RV6 (NTSC)	I-2	S5	F-1		
E1	H-1	LVE	C-6	Q19	E-2	RV7	I-2	TP1	G-4		
		Q2	G-6	Q20	E-3	RV8	H-2	TP2	G-4		
				Q21	E-2	RV9	G-2	TP3	G-4		
				Q22	A-2	RV10	G-2				
				Q23	E-4	RV11	E-3	TP5	G-2		

- SOLDERING SIDE -  
**EN-28A** BOARD  
T-612-6601-01  
DEC-MSA (LOC-1)  
DEC-MSM (EX)





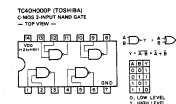
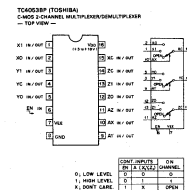
-SOLDERING SIDE-  
**EN-28A BOARD**  
S-802-8640-15  
DSC-M55A (PC-1)  
DSC-M55A (PC-2)



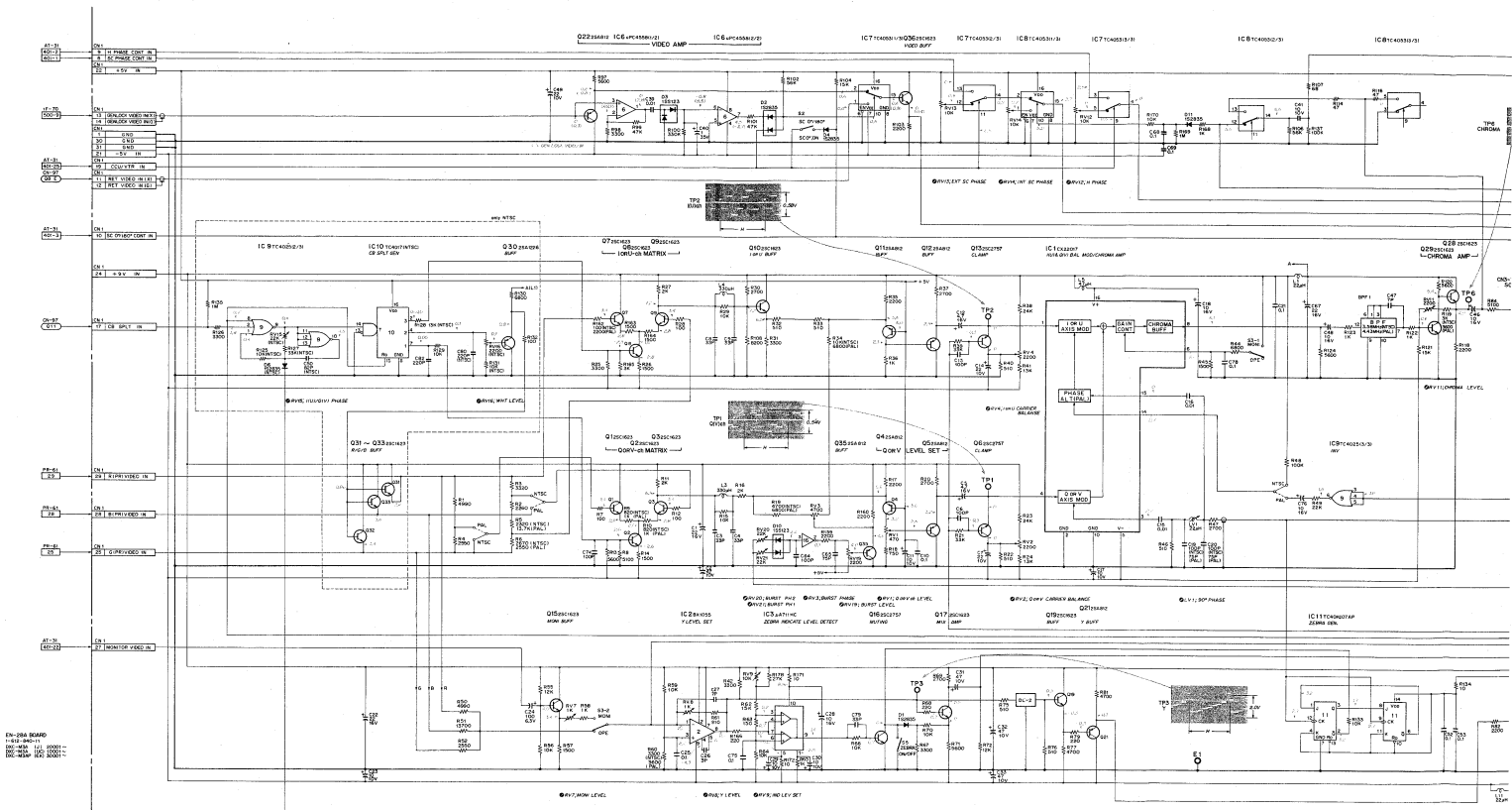
LENGTH SELECT TRUTH TABLE

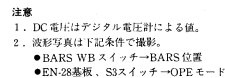
LENGTH SELECT	DATA IN	DATA OUT
0000	0000	0000
0001	0001	0001
0010	0010	0010
0011	0011	0011
0100	0100	0100
0101	0101	0101
0110	0110	0110
0111	0111	0111
1000	1000	1000
1001	1001	1001
1010	1010	1010
1011	1011	1011
1100	1100	1100
1101	1101	1101
1110	1110	1110
1111	1111	1111

0: LOW LEVEL  
1: HIGH LEVEL  
X: DON'T CARE



### EN-28A BOARD (ENCODER)





**NOTE:**

- 5-44



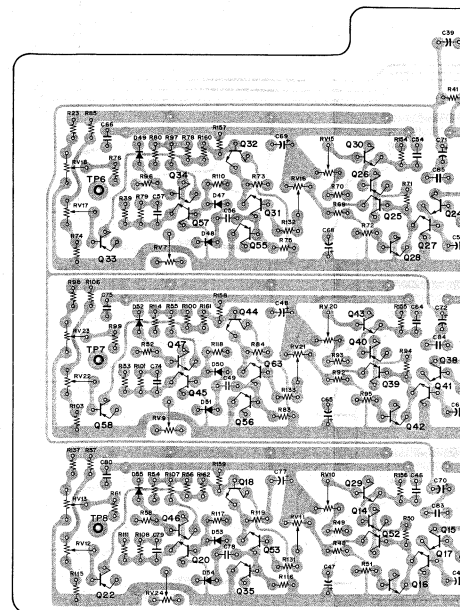
PS-15 BOARD (POWER SUPPLY, ABO)

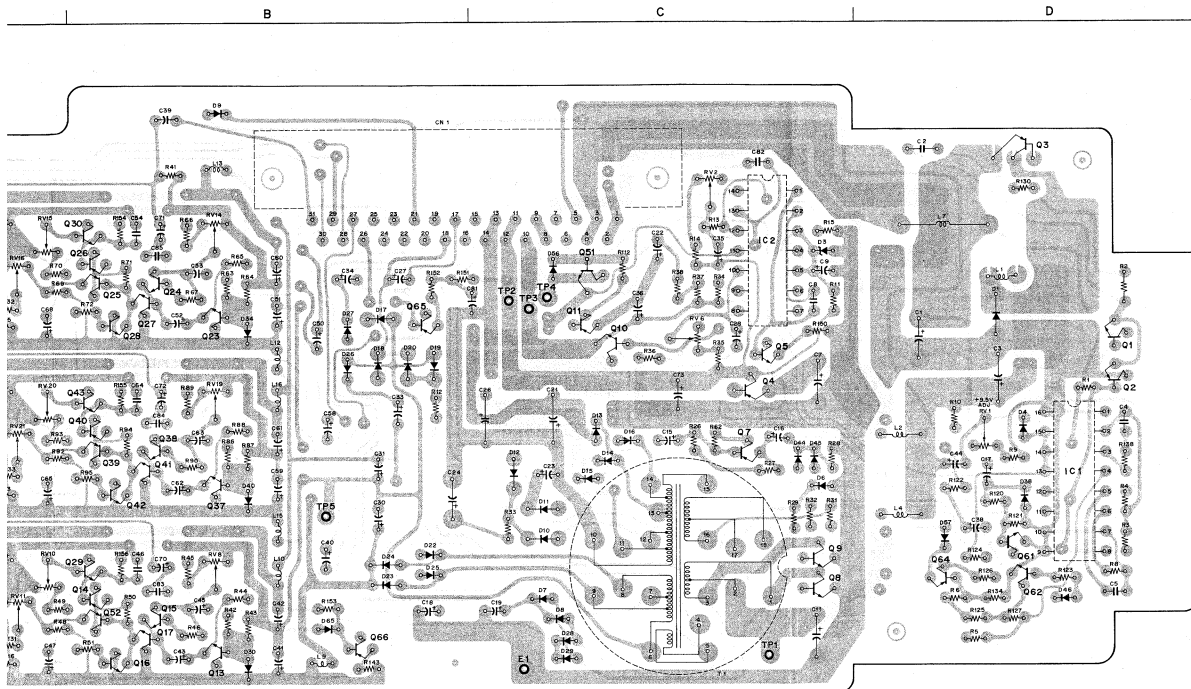
A

1

2

3





-SOLDERING SIDE-

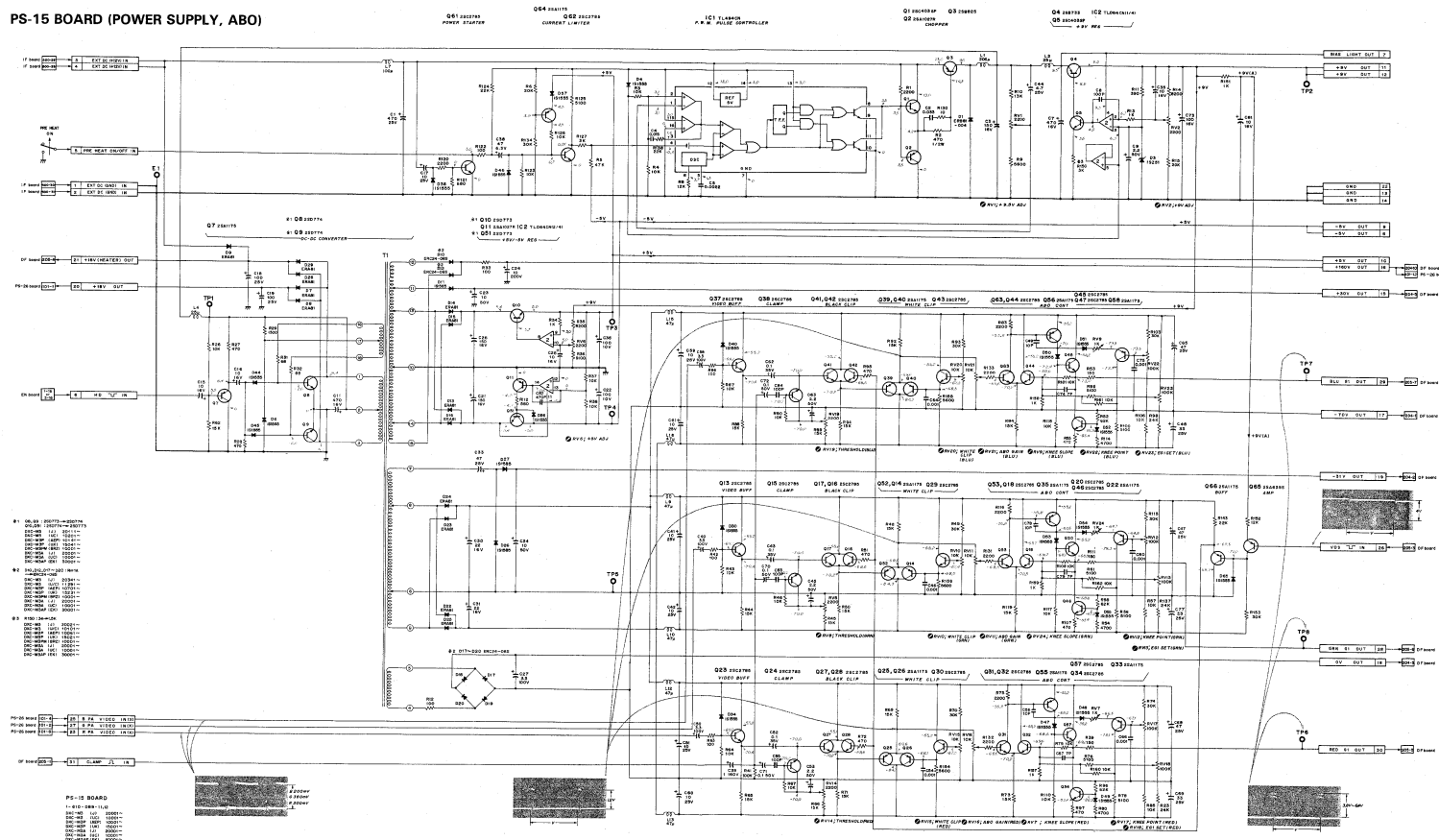
PS-15 BOARD

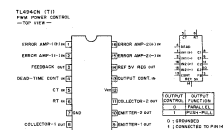
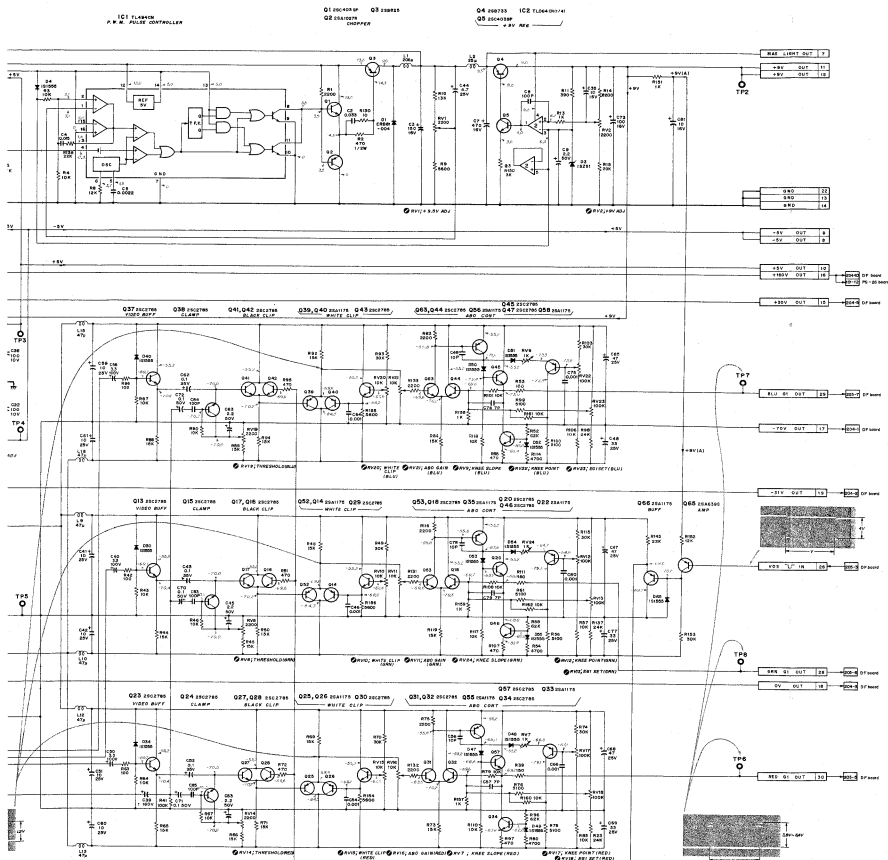
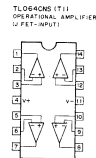
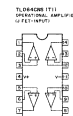
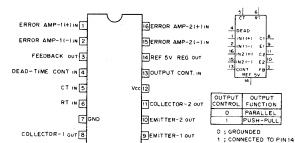
1-600-DP1-14  
2-600-MAA-11C-1  
3-600-MAA-11C-1  
4-600-MAA-11C-1

CN1	B-1	Q22	A-3
D1	D-1	Q23	B-1
D3	C-1	Q24	B-1
D4	C-2	Q25	B-1
D6	C-2	Q26	B-1
D7	C-2	Q27	B-1
D8	C-3	Q28	B-1
D9	B-1	Q29	B-3
D10	C-3	Q30	B-1
D11	C-2	Q31	A-1
D12	C-2	Q32	A-1
D13	C-2	Q33	A-1
D14	C-2	Q34	A-1
D15	C-2	Q35	A-3
D16	C-2	Q36	B-2
D17	B-1	Q37	B-2
D18	B-2	Q38	B-2
D19	B-2	Q39	B-2
D20	B-2	Q40	B-2
D22	B-3	Q41	B-2
D23	B-3	Q42	B-2
D24	B-3	Q43	B-2
D25	B-3	Q44	A-2
D26	B-3	Q45	A-2
D27	B-1	Q46	A-3
D28	C-3	Q47	A-2
D29	C-3	Q48	A-3
D30	B-3	Q49	A-3
D31	B-1	Q50	A-1
D32	D-2	Q51	C-1
D33	D-2	Q52	B-3
D34	B-1	Q53	A-3
D35	D-2	Q54	A-1
D36	B-2	Q55	A-1
D37	C-2	Q56	A-2
D38	D-3	Q57	A-1
D39	D-3	Q58	A-2
D40	D-3	Q59	D-3
D41	D-3	Q60	A-3
D42	D-3	Q61	D-3
D43	D-3	Q62	A-3
D44	D-3	Q63	D-3
D45	A-1	Q64	B-1
D46	A-1	Q65	B-1
D47	A-1	Q66	B-3
D48	A-1		
D49	A-2	RV1	D-2
D50	A-2	RV2	C-1
D51	A-2	RV3	C-1
D52	A-2	RV4	C-1
D53	A-3	RV5	A-1
D54	A-3	RV6	B-3
D55	A-3	RV7	A-2
D56	C-1	RV8	A-2
D57	D-3	RV9	A-2
D58	B-3	RV10	A-3
D59	B-3	RV11	A-3
D60	B-3	RV12	A-3
D61	B-3	RV13	A-3
D62	B-3	RV14	A-3
D63	B-3	RV15	B-1
D64	B-3	RV16	A-1
D65	B-3	RV17	A-1
D66	B-3	RV18	A-1
D67	B-3	RV19	B-2
D68	B-3	RV20	A-2
D69	B-3	RV21	A-2
D70	B-3	RV22	A-2
D71	B-3	RV23	A-2
D72	B-3	RV24	A-3
D73	B-3		
D74	B-3	T1	C-3
D75	B-3	TP1	C-3
D76	B-3	TP2	C-1
D77	B-3	TP3	C-1
D78	B-3	TP4	B-2
D79	B-3	TP5	A-1
D80	B-3	TP6	A-3
D81	B-3	TP7	A-3
D82	B-3	TP8	A-3
D83	B-3	TP9	A-3
D84	B-3	TP10	A-3
D85	B-3	TP11	A-3
D86	B-3	TP12	A-3
D87	B-3	TP13	A-3
D88	B-3	TP14	A-3
D89	B-3	TP15	A-3
D90	B-3	TP16	A-3
D91	B-3	TP17	A-3
D92	B-3	TP18	A-3
D93	B-3	TP19	A-3
D94	B-3	TP20	A-3
D95	B-3	TP21	A-3
D96	B-3	TP22	A-3
D97	B-3	TP23	A-3
D98	B-3	TP24	A-3
D99	B-3	TP25	A-3
D100	B-3	TP26	A-3



PS-15 BOARD (POWER SUPPLY, ABO)



T1000N (T1)  
P.W. POWER CONTROL  
TOP VIEW

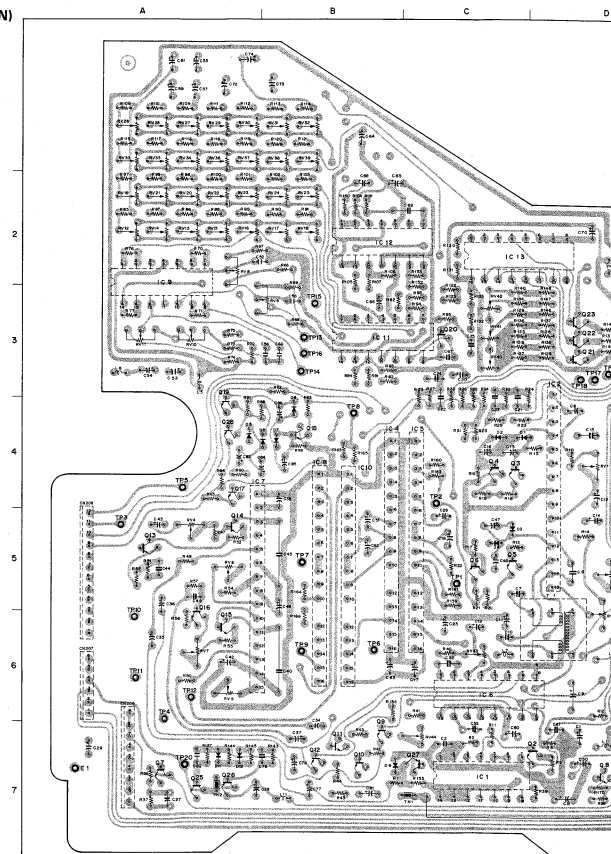
## 注意

- DC 電圧はデジタル電圧計による値。
- 波形写真は下記条件で撮影。
  - ホワイトウィンドーチャートを画角2/3程度で撮る。この時PR-61基板のTP1でレベルが400mVp-pになる様にレンズアリスをセットする。(F4、波数モニターで100IRE)。
  - GAIN スイッチ→0dB位置。
  - BARS/WB スイッチ→3200°K位置。
  - フィルターディスク→1°。

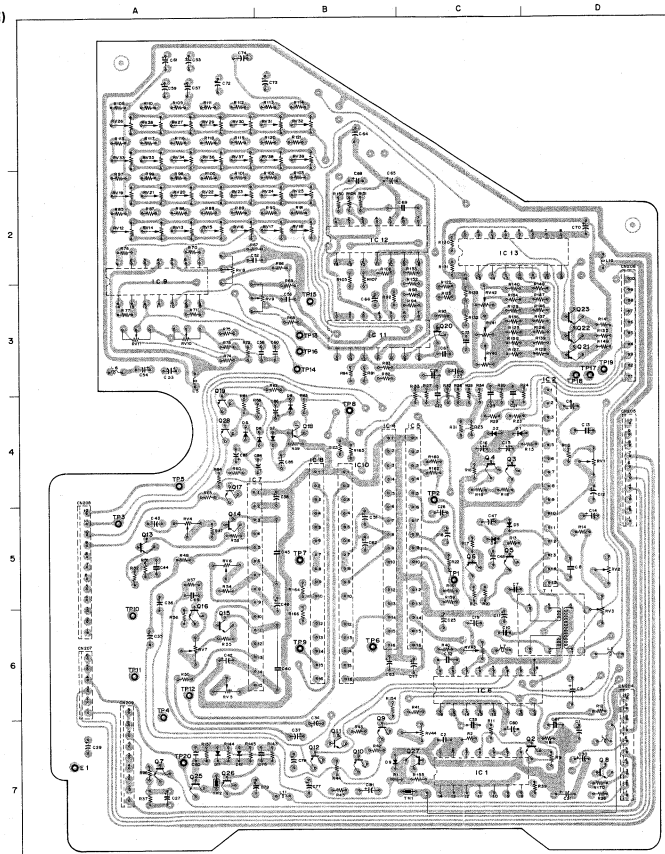
## NOTE:

- All voltage are dc, measured with a digital volt meter. (input resistance 10 MO).
- All waveforms are taken in condition below.
  - Shoot the white window pattern where a white portion is about 2/3 on the picture frame. Adjust lens iris so that a white level at TP1/PR-61 board is 400 mV. (F=4, White level on the waveform monitor is 100 IRE).
  - Set camera GAIN switch to 0 dB position.
  - Set camera BARS/WB switch to 3200°K position.

DF-20 BOARD (DEFLECTION)



DF-20 BOARD (DEFLECTION)



—SOLDERING SIDE—  
DF-20 BOARD  
SEC-REL. 100-1

CH204 D-7  
CH205 D-4  
CH206 B-3  
CH207 B-2  
CH208 A-5  
TP17 B-2  
TP18 D-3  
TP19 D-3  
TP20 A-7

D1 C-4  
D2 C-4  
D3 C-3  
D4 A-4  
D5 A-4  
D6 B-4  
D7 B-3  
D8 B-3  
D9 A-7  
D10 A-7  
D11 A-7  
D12 A-7

B1 A-7  
IC1 C-7  
IC2 C-7  
IC3 B-5  
IC4 C-5  
IC5 C-5  
IC6 C-5  
IC7 C-5  
IC8 A-5  
IC9 A-5  
IC10 A-5  
IC11 B-3  
IC12 C-2  
IC13 C-2

CH204 D-7  
CH205 D-4  
CH206 B-3  
CH207 B-2  
CH208 A-5  
TP17 B-2  
TP18 D-3  
TP19 D-3  
TP20 A-7  
D1 C-4  
D2 C-4  
D3 C-3  
D4 A-4  
D5 A-4  
D6 B-4  
D7 B-3  
D8 B-3  
D9 A-7  
D10 A-7  
D11 A-7  
D12 A-7

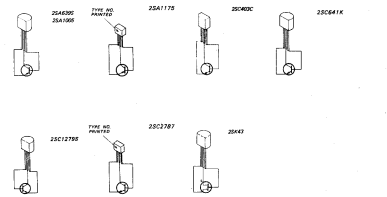
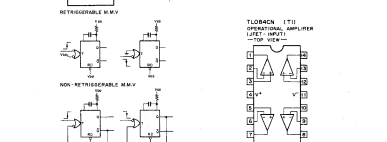
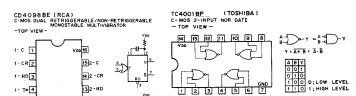
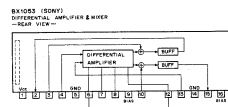
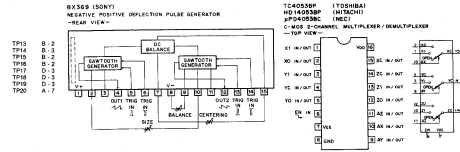
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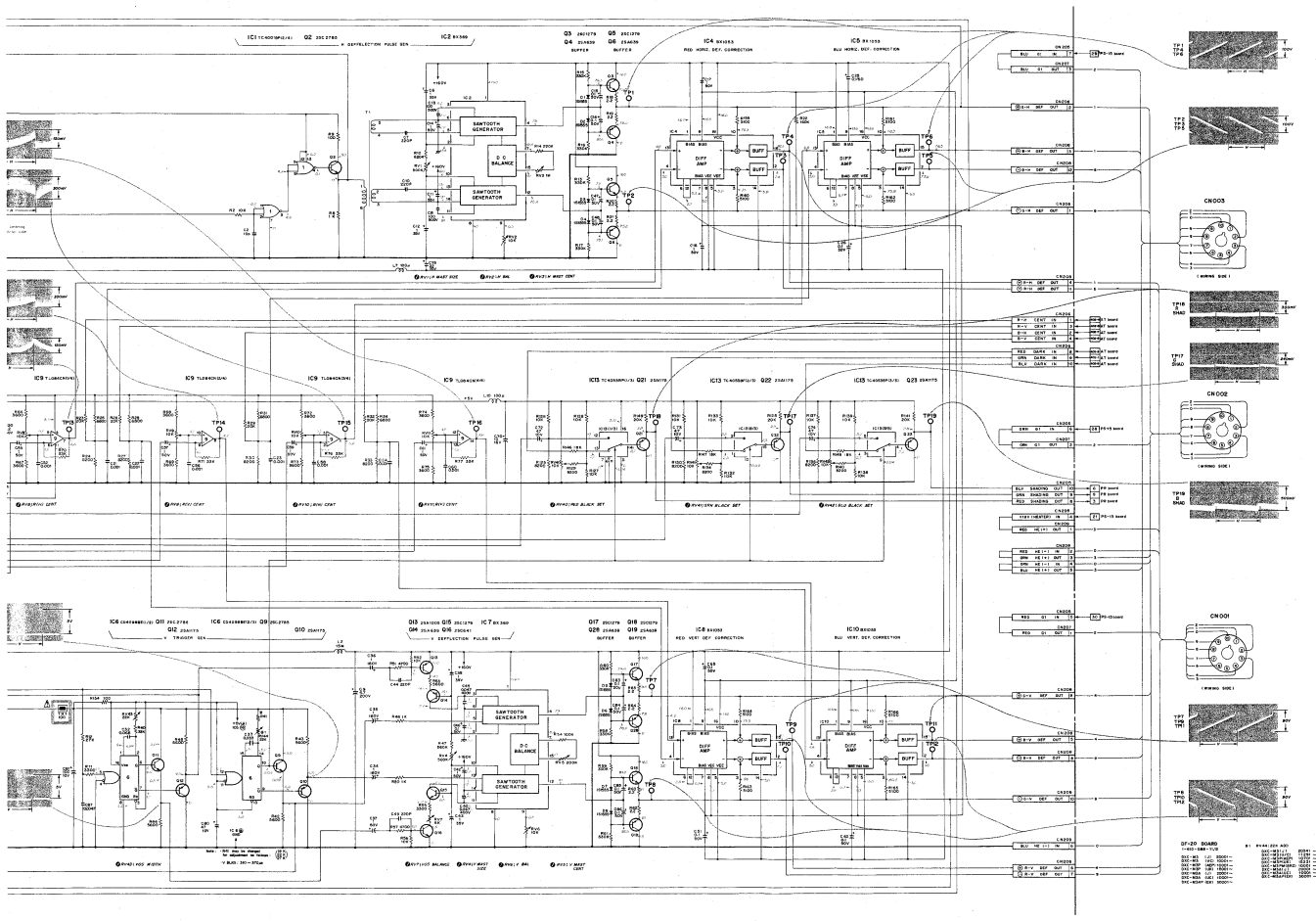
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RV85 A-2  
RV86 A-2  
RV87 A-2  
RV88 A-2  
RV89 A-2  
RV90 A-2  
RV91 A-2  
RV92 A-2  
RV93 A-2  
RV94 A-2  
RV95 A-2  
RV96 A-2  
RV97 A-2  
RV98 A-2  
RV99 A-2  
RV100 A-2







## 注意

1. DC 電圧はデジタル電圧計による値。
2. 波影写真は下記条件で撮影。
- ホワイトインディケーターを撮り、PR-61 基板、TP-1 の (1) ビデオレベルが 400mVpp になるレベルズアリスをセットする (F=4)。
3. ①印及び ②印された部品は安全性を維持するために重要な部品です。従って交換する時は必ず指定の部品を使って下さい。

## NOTE:

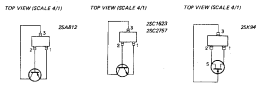
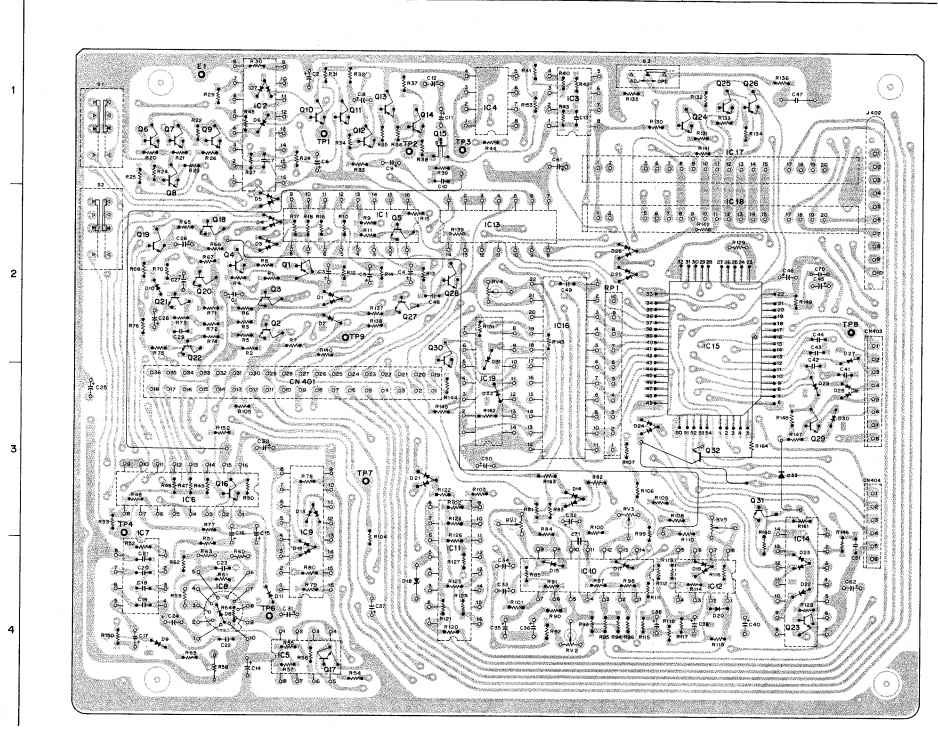
1. All voltage are dc, measured with a digital volt meter (input resistance 10 M $\Omega$ ).
2. All waveforms are taken in condition below.
  - Shoot the white window pattern where a white is about 2/3 H size on the picture frame.
  - Adjust lens iris so that a white level at TP-1/PR-61 board is 400 mV (F=4).
  - Set camera GAIN switch to the OdB position.
  - Set camera BARS WB switch to the 3200°K position.

3. The shaded and  $\Delta$ -marked components are critical to safety. Replace only with same components as specified.



AT-31 BOARD (AUTO B/W & AUTO CENT/GAIN CONTROL)

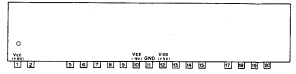
A B C D



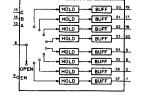
— SOLDERING SIDE —  
**AT-31 BOARD**  
1100-100  
25-100-100

- CN401 B-3
- CN403 D-3
- CN404 D-3
- Q1 B-2
- Q2 A-2
- Q3 A-2
- Q4 B-2
- Q5 A-2
- Q6 A-1
- Q7 A-1
- Q8 A-1
- Q9 A-1
- Q10 A-4
- Q11 A-4
- Q12 A-4
- Q13 B-3
- Q14 C-4
- Q15 C-4
- Q16 B-4
- Q17 D-4
- Q18 B-4
- Q19 D-4
- Q20 B-3
- Q21 B-3
- Q22 D-4
- Q23 D-4
- Q24 D-1
- Q25 D-1
- Q26 D-1
- Q27 B-2
- Q28 B-2
- Q29 D-3
- Q30 B-2
- Q31 D-3
- Q32 D-3
- Q33 C-2
- Q34 C-2
- Q35 C-2
- Q36 C-2
- Q37 C-2
- Q38 C-2
- Q39 D-3
- Q40 D-3
- Q41 C-2
- Q42 C-3
- Q43 D-3
- Q44 A-1
- Q45 B-2
- Q46 A-1
- Q47 A-1
- Q48 A-1
- Q49 A-1
- Q50 A-4
- Q51 A-4
- Q52 A-4
- Q53 A-4
- Q54 A-4
- Q55 A-4
- Q56 A-4
- Q57 A-4
- Q58 A-4
- Q59 A-4
- Q60 A-4
- Q61 A-4
- Q62 A-4
- Q63 A-4
- Q64 A-4
- Q65 A-4
- Q66 A-4
- Q67 A-4
- Q68 A-4
- Q69 A-4
- Q70 A-4
- Q71 A-4
- Q72 A-4
- Q73 A-4
- Q74 A-4
- Q75 A-4
- Q76 A-4
- Q77 A-4
- Q78 A-4
- Q79 A-4
- Q80 A-4
- Q81 A-4
- Q82 A-4
- Q83 A-4
- Q84 A-4
- Q85 A-4
- Q86 A-4
- Q87 A-4
- Q88 A-4
- Q89 A-4
- Q90 A-4
- Q91 A-4
- Q92 A-4
- Q93 A-4
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- Q97 A-4
- Q98 A-4
- Q99 A-4
- Q100 A-4

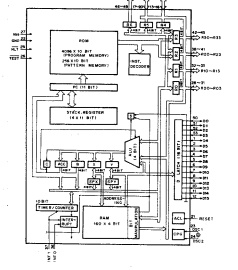
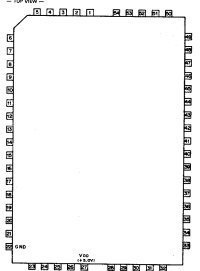
REPLACES (2001)  
B-CHANNEL SELECTABLE SAMPLING HOLDERS  
PRINTED SIDE —



1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12



HD4040000 (SMT) PLAT PACKAGE  
1100-100  
TOP VIEW



LEFT/RIGHT  
SIDE VIEW  
— BOTTOM

REPLACES (2001)  
BALANCE  
TOP VIEW



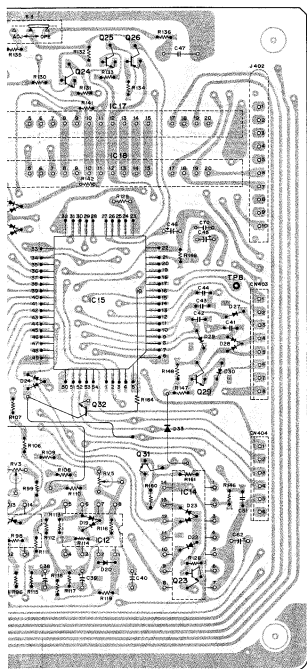
HD4040000 (SMT) PLAT PACKAGE  
1100-100  
TOP VIEW

- Q1 B-2
- Q2 A-2
- Q3 A-2
- Q4 B-2
- Q5 A-2
- Q6 A-1
- Q7 A-1
- Q8 A-1
- Q9 A-1
- Q10 A-4
- Q11 A-4
- Q12 A-4
- Q13 B-3
- Q14 C-4
- Q15 C-4
- Q16 B-4
- Q17 D-4
- Q18 B-4
- Q19 D-4
- Q20 B-3
- Q21 B-3
- Q22 D-4
- Q23 D-4
- Q24 D-1
- Q25 D-1
- Q26 D-1
- Q27 B-2
- Q28 B-2
- Q29 D-3
- Q30 B-2
- Q31 D-3
- Q32 D-3
- Q33 C-2
- Q34 C-2
- Q35 C-2
- Q36 C-2
- Q37 C-2
- Q38 C-2
- Q39 D-3
- Q40 D-3
- Q41 C-2
- Q42 C-3
- Q43 D-3
- Q44 A-1
- Q45 B-2
- Q46 A-1
- Q47 A-1
- Q48 A-1
- Q49 A-1
- Q50 A-4
- Q51 A-4
- Q52 A-4
- Q53 A-4
- Q54 A-4
- Q55 A-4
- Q56 A-4
- Q57 A-4
- Q58 A-4
- Q59 A-4
- Q60 A-4
- Q61 A-4
- Q62 A-4
- Q63 A-4
- Q64 A-4
- Q65 A-4
- Q66 A-4
- Q67 A-4
- Q68 A-4
- Q69 A-4
- Q70 A-4
- Q71 A-4
- Q72 A-4
- Q73 A-4
- Q74 A-4
- Q75 A-4
- Q76 A-4
- Q77 A-4
- Q78 A-4
- Q79 A-4
- Q80 A-4

Q1 B-2  
Q2 A-2  
Q3 A-2  
Q4 B-2  
Q5 A-2  
Q6 A-1  
Q7 A-1  
Q8 A-1  
Q9 A-1  
Q10 A-4  
Q11 A-4  
Q12 A-4  
Q13 B-3  
Q14 C-4  
Q15 C-4  
Q16 B-4  
Q17 D-4  
Q18 B-4  
Q19 D-4  
Q20 B-3  
Q21 B-3  
Q22 D-4  
Q23 D-4  
Q24 D-1  
Q25 D-1  
Q26 D-1  
Q27 B-2  
Q28 B-2  
Q29 D-3  
Q30 B-2  
Q31 D-3  
Q32 D-3  
Q33 C-2  
Q34 C-2  
Q35 C-2  
Q36 C-2  
Q37 C-2  
Q38 C-2  
Q39 D-3  
Q40 D-3  
Q41 C-2  
Q42 C-3  
Q43 D-3  
Q44 A-1  
Q45 B-2  
Q46 A-1  
Q47 A-1  
Q48 A-1  
Q49 A-1  
Q50 A-4  
Q51 A-4  
Q52 A-4  
Q53 A-4  
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Q62 A-4  
Q63 A-4  
Q64 A-4  
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Q66 A-4  
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Q68 A-4  
Q69 A-4  
Q70 A-4  
Q71 A-4  
Q72 A-4  
Q73 A-4  
Q74 A-4  
Q75 A-4  
Q76 A-4  
Q77 A-4  
Q78 A-4  
Q79 A-4  
Q80 A-4

- Q1 B-2
- Q2 A-2
- Q3 A-2
- Q4 B-2
- Q5 A-2
- Q6 A-1
- Q7 A-1
- Q8 A-1
- Q9 A-1
- Q10 A-4
- Q11 A-4
- Q12 A-4
- Q13 B-3
- Q14 C-4
- Q15 C-4
- Q16 B-4
- Q17 D-4
- Q18 B-4
- Q19 D-4
- Q20 B-3
- Q21 B-3
- Q22 D-4
- Q23 D-4
- Q24 D-1
- Q25 D-1
- Q26 D-1
- Q27 B-2
- Q28 B-2
- Q29 D-3
- Q30 B-2
- Q31 D-3
- Q32 D-3
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- Q34 C-2
- Q35 C-2
- Q36 C-2
- Q37 C-2
- Q38 C-2
- Q39 D-3
- Q40 D-3
- Q41 C-2
- Q42 C-3
- Q43 D-3
- Q44 A-1
- Q45 B-2
- Q46 A-1
- Q47 A-1
- Q48 A-1
- Q49 A-1
- Q50 A-4
- Q51 A-4
- Q52 A-4
- Q53 A-4
- Q54 A-4
- Q55 A-4
- Q56 A-4
- Q57 A-4
- Q58 A-4
- Q59 A-4
- Q60 A-4
- Q61 A-4
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- Q67 A-4
- Q68 A-4
- Q69 A-4
- Q70 A-4
- Q71 A-4
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- Q73 A-4
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- Q76 A-4
- Q77 A-4
- Q78 A-4
- Q79 A-4
- Q80 A-4

**D**

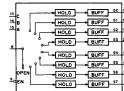
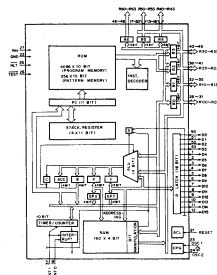
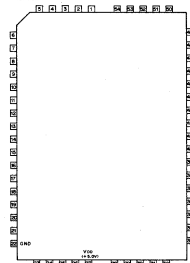


CN001	B-3	G23	D-4
CN003	A-3	G24	D-1
CN004	A-3	G25	D-1
D1	B-2	G26	D-1
D2	B-2	G28	D-2
D3	B-2	G27	B-2
D4	A-2	G29	D-2
D5	A-2	G30	D-2
D6	A-1	G31	D-3
D7	A-1	G32	D-3
D8	A-4	RP1	C-2
D9	A-4	RP2	C-2
D10	A-2	RP3	C-3
D11	A-2	RP4	C-3
D12	B-4	RP5	C-3
D13	B-4	RP6	C-3
D14	C-3	RP7	D-3
D15	C-3	RP8	D-3
D16	C-4	S1	A-1
D17	C-4	S2	A-1
D18	C-4	S3	C-1
D19	C-4	S4	C-1
D20	B-3	TP1	B-1
D21	B-3	TP2	B-1
D22	A-4	TP3	B-1
D23	A-4	TP4	B-1
D24	A-4	TP5	B-1
D25	C-2	TP6	A-4
D26	C-2	TP7	A-4
D27	D-2	TP8	D-2
D28	D-2	TP9	D-2
D29	D-3		
D30	D-3		
D31	D-3		
D32	D-3		
D33	D-3		
D34	D-3		
D35	D-3		
D36	D-3		
D37	D-3		
D38	D-3		
D39	D-3		
D40	D-3		
D41	D-3		
D42	D-3		
D43	D-3		
D44	D-3		
D45	D-3		
D46	D-3		
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D50	D-3		
D51	D-3		
D52	D-3		
D53	D-3		
D54	D-3		
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D57	D-3		
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D61	D-3		
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D64	D-3		
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D66	D-3		
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D68	D-3		
D69	D-3		
D70	D-3		
D71	D-3		
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D73	D-3		
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D82	D-3		
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D138	D-3		
D139	D-3		
D140	D-3		
D14			

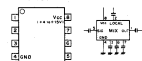
8X1179 (SONY)  
8-CHANNEL SELECTABLE SAMPLING HOLDS



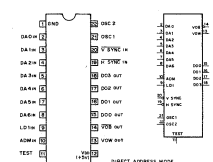
EN	C	B	A	POPC CHANNEL
0	0	0	0	50
0	0	0	1	51
0	0	1	0	52
0	0	1	1	53
0	1	0	0	54
0	1	0	1	55
0	1	1	0	56
0	1	1	1	57
1	X	X	X	OPEN

HD44880B03 (HITACHI) FLAT PACKAGE  
C-MOS 4-BIT MICROPROCESSORLM711CH (NS)  
DUAL, DIFFERENTIAL VOLTAGE COMPARATOR

SN16912P (Ti)  
BALANCED MIXER



MINI227A (MATSUSHITA)  
N-MOS PROGRAMMABLE TV DISPLAY CONTROLLER  
— TOP VIEW —



**DIRECT ADDRESS MODE**

D40 - D46 : ADDRESS INPUT  
LD1 : LOAD DATA AND INSTRUCTION  
ADM : ADDRESS INCREMENT MODE  
V0B : VIDEO BLACK OUT  
V0W : VIDEO WHITE OUT  
D40 : DATA INPUT  
D46 : DATA OUTPUT

ADDRESS INCREMENT MODE

ADM

LDI

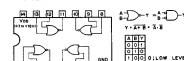
D40

DOOR CASE

NUM2903D (JRC)  
OPERATIONAL AMPLIFIER



TC4001BP (TOSHIBA)  
CMOS 2-INPUT NOR GATE

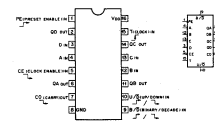
TC40638P (TOSHIBA)  
C-MOS 2-CHANNEL MUX

	CONT. INPUTS	ON
	EN A (X,Y,Z)	CHANNEL
0: LOW LEVEL	0	0
1: HIGH LEVEL	0	1
X: DON'T CARE	1	OPEN

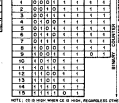
TO4084UBP (TOSHIBA)  
C-MOS INVERTER  
200-10000

TLOMCH (T)  
OPERATIONAL AMPLIFIER  
C.1. SET-AMPLITUDE

TC4029BP (TOSHIBA)  
C-MOS PRESETTABLE 4-BIT BINARY/DECADE UP/DOWN COUNTER



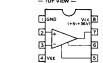
STATE	OUTPUTS			
	CONCRETE	STEEL	WOOD	GLASS
CA	10.0	10.0	10.0	10.0



COMPTON

TLO82CP (TI)  
OPERATIONAL AMPLIFIER  
(MAX 148025)

µPC311C (NEC)  
 µPC311G2 (NEC) FLAT PACKAGE  
 VOLTAGE COMPARATOR



— SOLDERING SIDE —  
**AT-31** BOARD

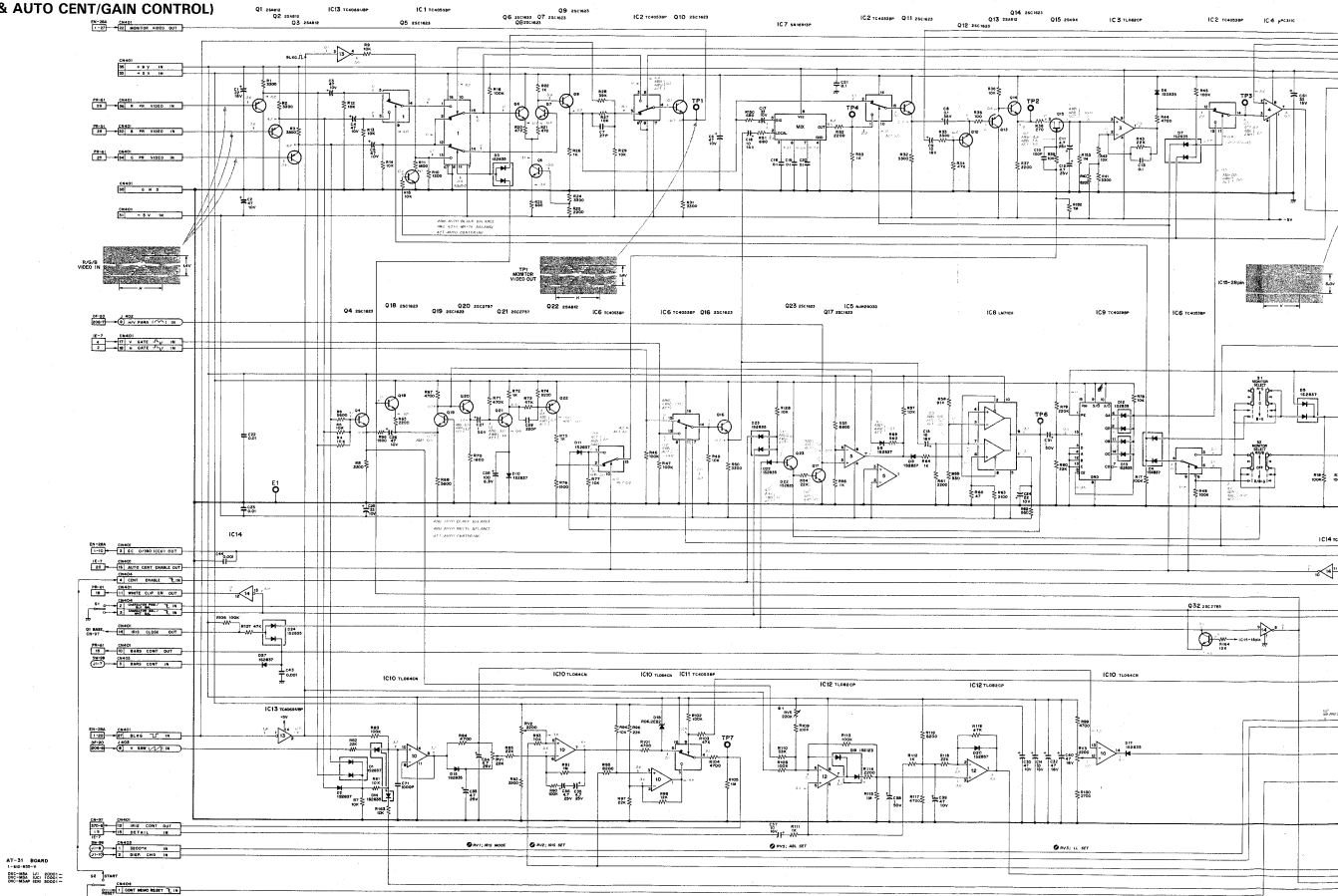
1-812-833-11  
DRC-MSA (SIC-1)  
DRC-MSAP (ERO)

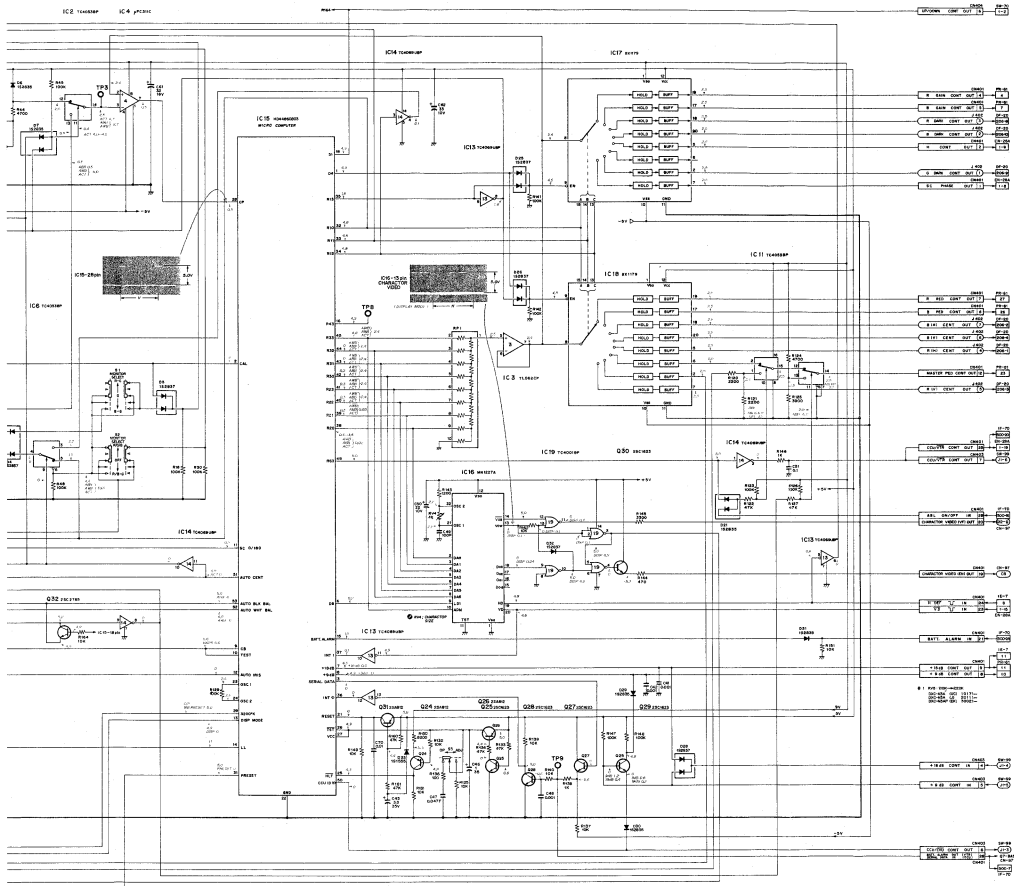
FIGURE 10.10



hex	00000001	00100010	01000101	01101111	10000011	10101011	11001101	11101110
00	A	B	C	D	E	F	G	H
01	I	J	K	L	M	.		
02	N	O	P	Q	R	S	T	U
03	V	W	X	Y	Z	?		
04								
05	0	1	2	3	4	5	6	7
06	8	9	:	.	-	/		

### AT-31 BOARD (AUTO B/W & AUTO CENT/GAIN CONTROL)





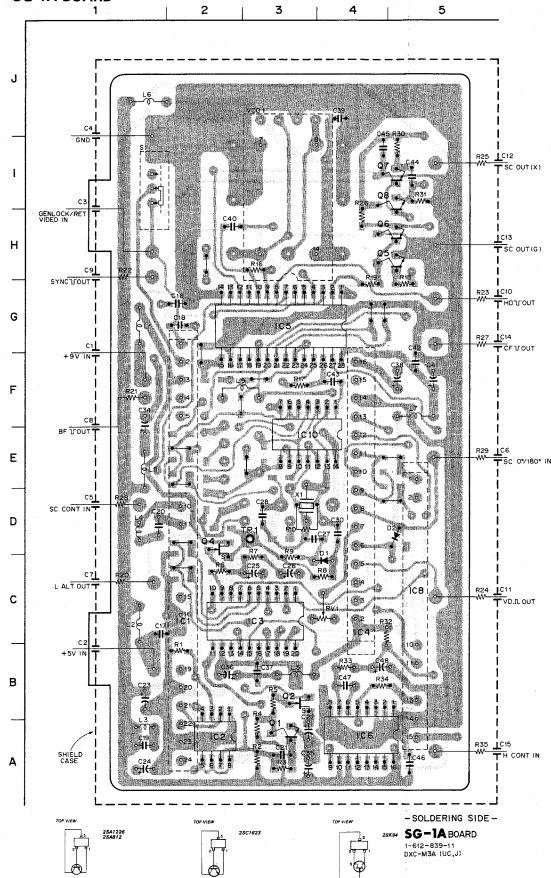
注意:

1. DC 電圧はデジタル電圧計による値。
2. 波形状写真は下記条件で撮影。
  - オートアイリスにて、グレースケールチャートを撮影。
  - S1スイッチ/AT-31基板→上側位置
  - S2スイッチ/AT-31基板→上側位置

NOTE:

1. All voltage are dc, measured with a digital volt meter (input resistance 10 MΩ).
2. All waveforms are taken in condition below.
  - Set the Lens AUTO/MANUAL select at AUTO position, and shoot the grayscale pattern on the pattern box.
  - Set S1 switch/AT-31 board at upper-position.
  - Set S2 switch/AT-31 board at upper-position.

SG-1A BOARD

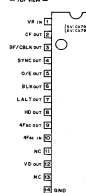


- |      |     |
|------|-----|
| D1   | C-3 |
| D2   | D-5 |
| IC1  | C-2 |
| IC2  | A-2 |
| IC3  | C-3 |
| IC4  | C-4 |
| IC5  | G-3 |
| IC6  | A-4 |
| IC8  | C-6 |
| IC10 | E-3 |
| LV1  | D-3 |
| G1   | A-3 |
| G2   | B-3 |
| G4   | D-2 |
| O5   | H-4 |
| O8   | H-4 |
| O7   | I-4 |
| O8   | I-4 |
| RV1  | C-3 |
| S1   | I-1 |
| TP1  | D-2 |
| VCO1 | I-3 |

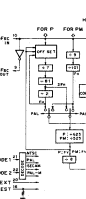
BEHIND (COPY)  
SING. SIDE VIEW



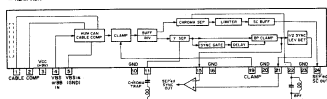
EXTENDED (COPY)  
SING. SIDE VIEW



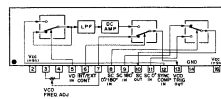
IC	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10	IC11	IC12	IC13	IC14	IC15
TYPE	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00	74LS00
QTY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
REF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15



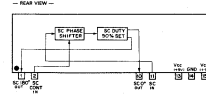
EX1040 (SONY)  
SYNC SEPARATOR  
— REAR VIEW —



EX1291 (SONY)  
APC AMPLIFIER AND SC G180° SELECTOR  
— REAR VIEW —



BX1292 (SONY)  
BX1293 (SONY)  
SC PHASE SHIFTER  
SCALING UNIT



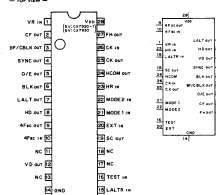
CX7928 (SONY) FLAT PACKAGE  
 C-MOS GENLOCK DRIVER FOR CX7722  
 — TOP VIEW —



INPUTS		EXT LOCK MODE	
MODE 1	MODE 2		
0	0	M1	PAL/VBS
1	0	M2	PAL-M/VBS
0	1	M3	PAL-VS/SC/LA SECAM-VS/SC/LA NTSC-VBS
1	1	M4	NTSC-VS/SC PAL-M-VS/SC/LA

0: LOW LEVEL  
1: HIGH LEVEL

DX7930-1 (SONY) FLAT PACKAGE  
C-MOS SYNC GENERATOR (NTSC, PAL-M, PAL, SECAM)  
— TOP VIEW —

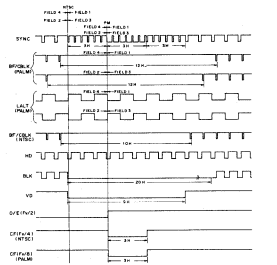


Q/E - ODD/EVEN FIELD  
CF - COLOR FRAME PULSE  
H00M - H COMPARATOR

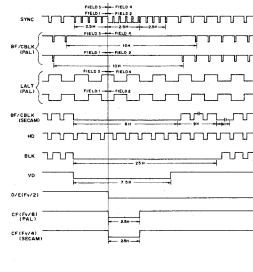
SYSTEM	APAC	CLOCK	INPUTS	MODE1	MODE2	SYSTEM	EXT TEST	FUNCTION
NTSC	300 Fw	900 Fw	0	0	NTSC	0	INTERNAL	
PAL	1125.25w29v	900 Fw	0	1	SECAM	0	INTERNAL	
PALM	900 Fw	900 Fw	1	0	PALM	1	EXT	
SECAM		900 Fw	1	1	PAL	1	TEST	

0 : LOW LEVEL (SING)	TEST OF OPEN
1 : HIGH LEVEL (SING)	INTERNALITY

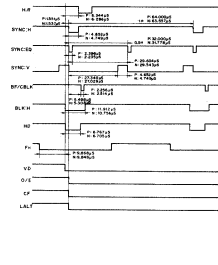
NTSC, PAL=M (FIELD 5.0)



PAL, SECAM (FIELD 4, 5)

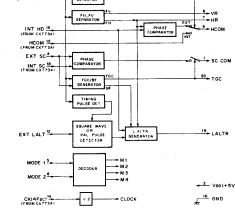


P: PAL, SECAM  
N: NTSC, PAL

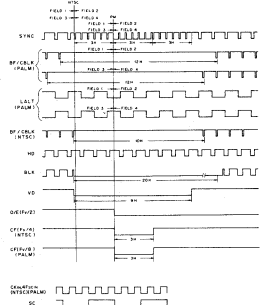


```

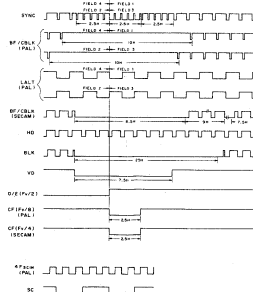
graph LR
    EXT_SYNC[EXT SYNC] --> EXT_INT_SEL[EXT/INT]
    EXT_INT_SEL --> EXT_INT_OUT[EXT/INT]
  
```



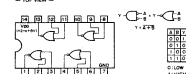
NTSC, PAL-M (FIELD 4)



PAL, SECAM (19 Hz L &amp; S)



TC40HC002F (TOSHIBA) FLAT PACKAGE  
CMOS 2-INPUT NOR GATE  
— TOP VIEW —

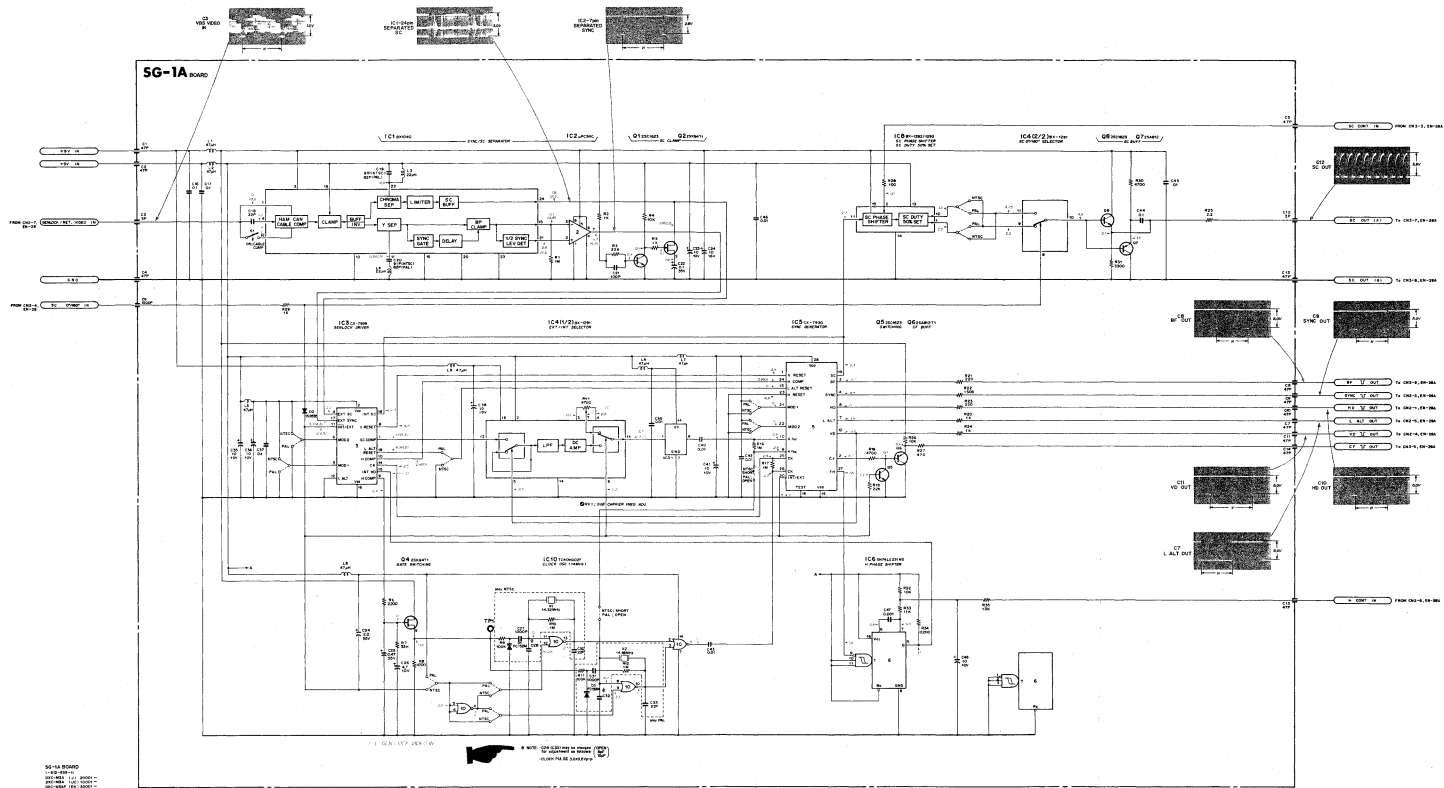


uPC311C (NEC)  
 uPC311G2 (NEC) FLAT PACKAGE  
 VOLTAGE COMPARATOR  
 — TOP VIEW —



C-3  
D-5  
  
C-2  
A-2  
C-3  
C-4  
G-3  
A-4  
C-5  
E-3  
  
D-3  
  
A-3  
B-3  
D-2  
H-4  
H-4  
I-4  
I-4  
  
C-3  
  
I-1  
  
D-2  
  
I-3

### SG-1A BOARD (SYNC GENERATOR)



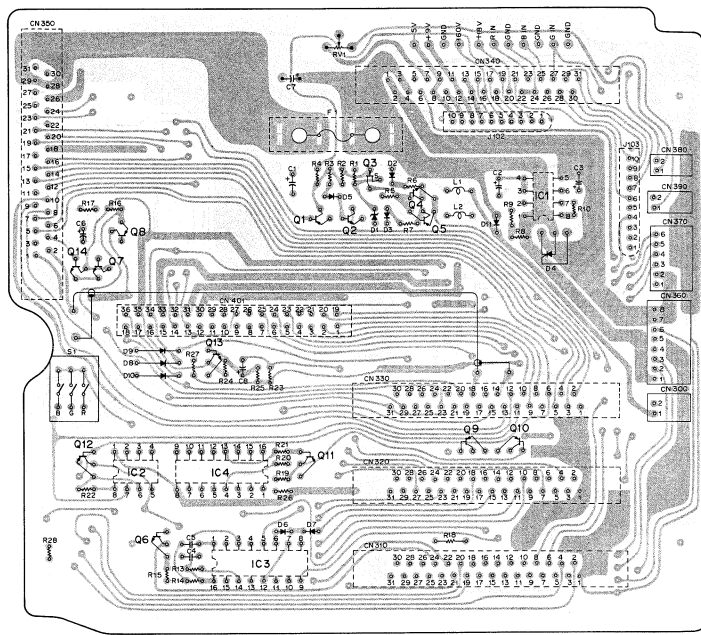
**注意**

1. DC 電圧はデジタル電圧計による値。
2. 波形写真は GENLOCK IN 端子よりカラーバー信号を入力する。

**NOTE:**

1. All voltage are dc, measured with a digital volt meter (input resistance 10 M $\Omega$ ).
2. All waveforms are taken in condition below.
  - Supply a color-bar signal to the GEN LOCK terminal.

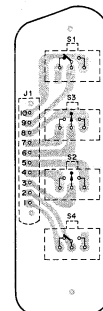
MAIN FRAME  
CN-97 BOARD  
SW-99 BOARD  
SW-70 BOARD



—SOLDERING SIDE—

**CN-97 BOARD**

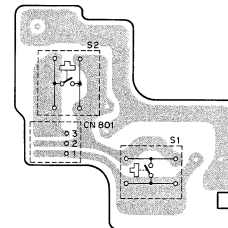
1-612-842-11 (UC,J)  
DXC-M3A (UC,J)



—SOLDERING SIDE—

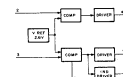
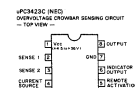
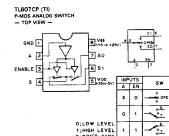
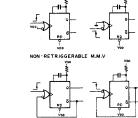
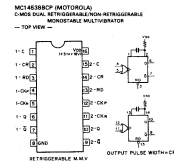
**SW-99 BOARD**

1-612-842-11 (UC,J)  
DXC-M3A (UC,J)  
DXC-M3AP (EK)



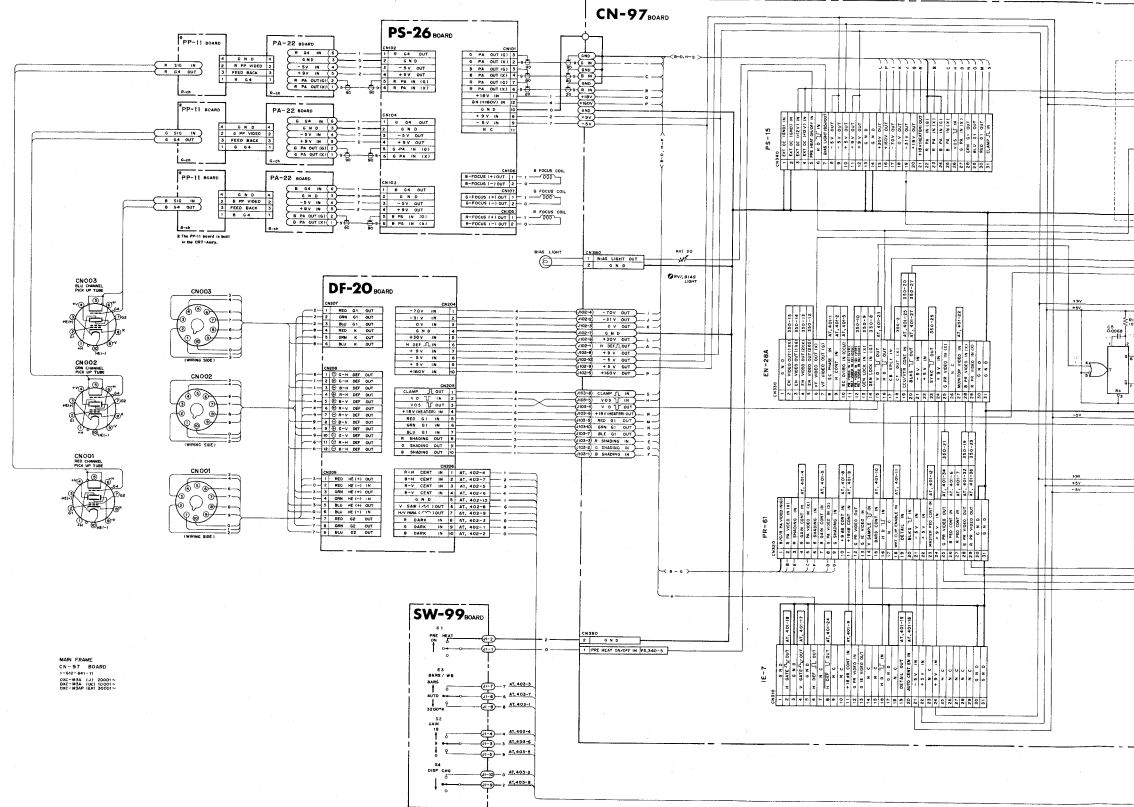
**SW-70 BOARD**

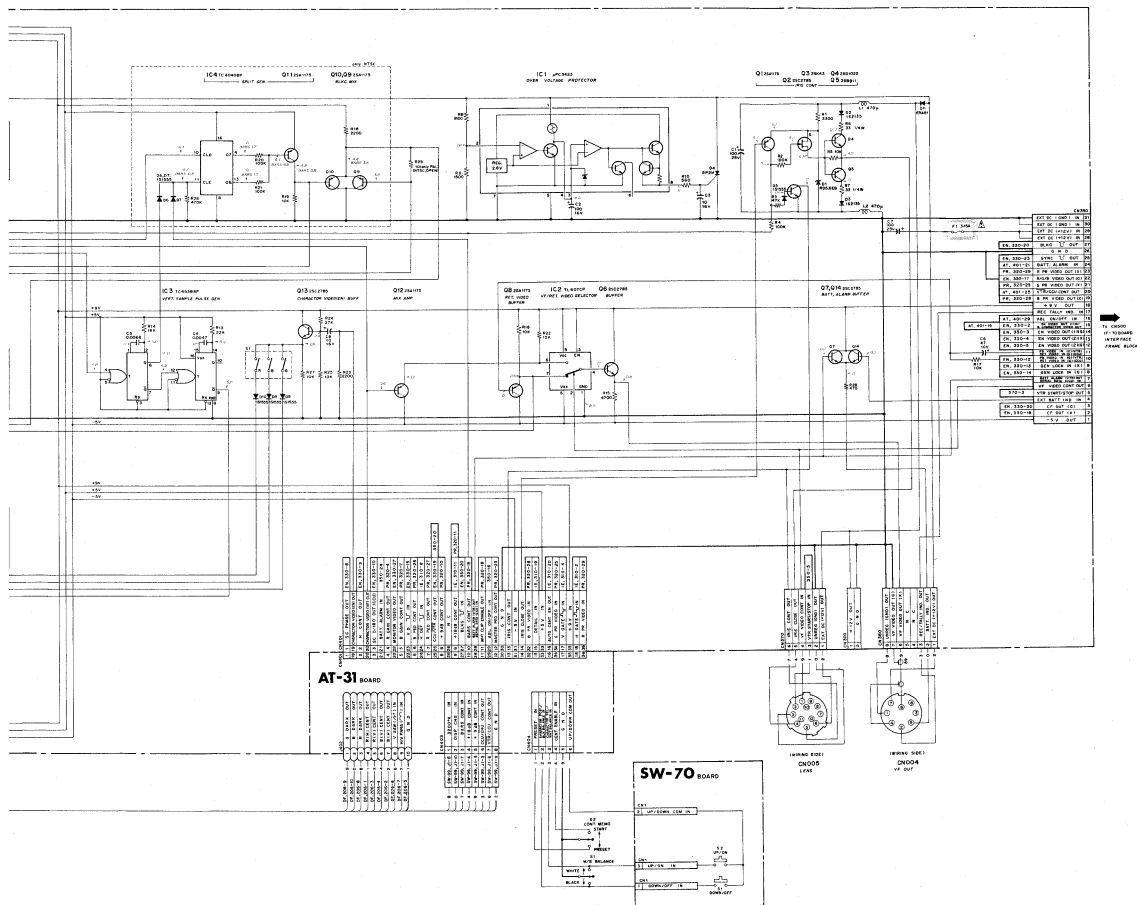
1-612-842-11  
DXC-M3A (UC,J)  
DXC-M3AP (EK)





MAIN FRAME  
CN-97 BOARD  
SW-99 BOARD  
SW-70 BOARD





## 注意:

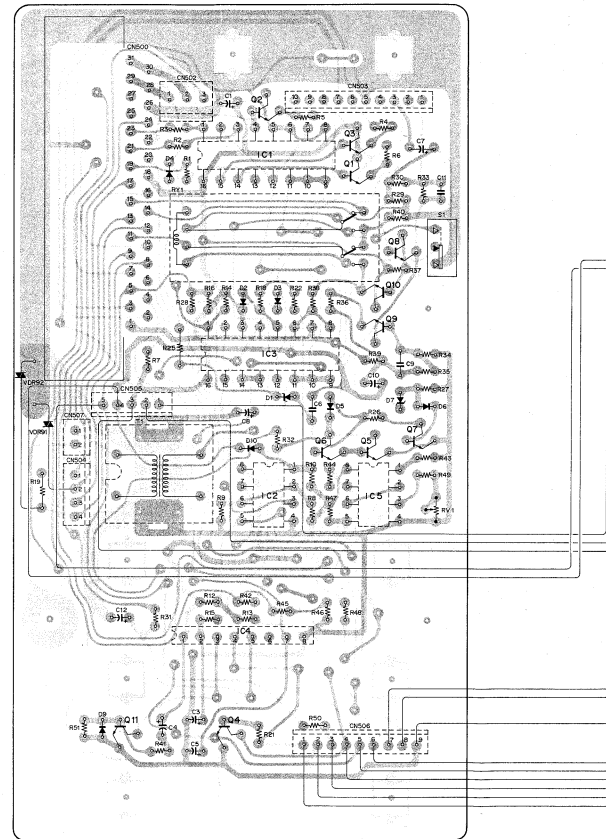
- DC 電圧は下記条件による値。  
● VTR/CCU コネクターにカメラアダプター CMA-7 を接続。  
● デジタル電圧計で測定。
- △ 印及び ■ で囲まれた部品は安全性を維持するために重要な部品です。従って交換する時は必ず指定の部品を使って下さい。

## NOTE:

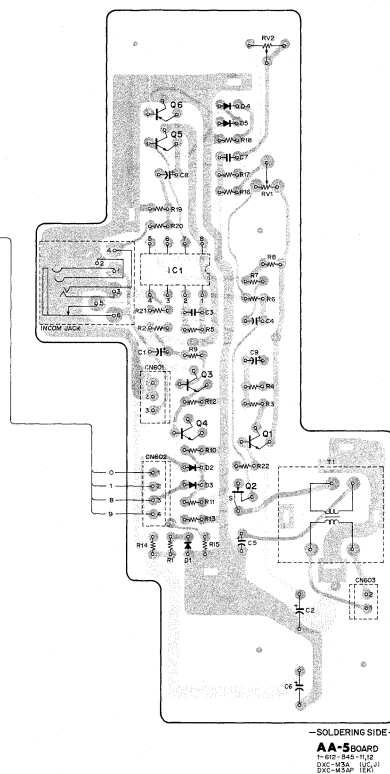
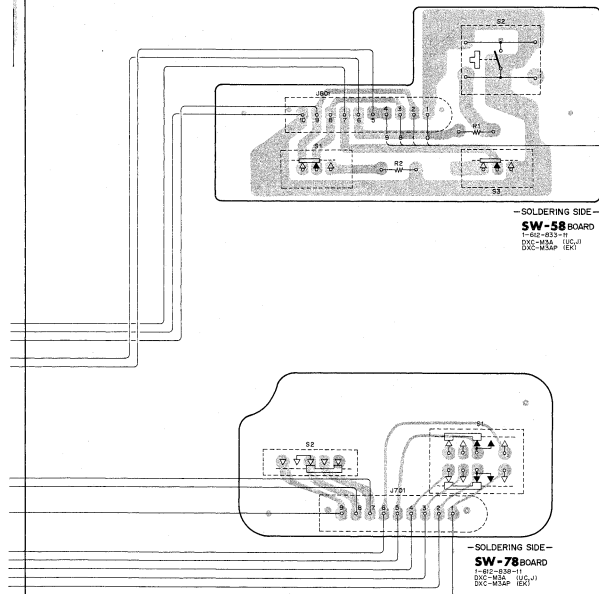
- All voltage are taken in condition below.  
● Digital voltmeter.  
● Power supply: used CMA-7.

- The shaded and △-marked components are critical to safety.  
Replace only with same components as specified.

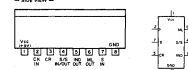
INTERFACE FRAME  
IF-70 BOARD  
AA-5 BOARD  
SW-58 BOARD  
SW-78 BOARD



~SOLDERING SIDE~  
**IF-70 BOARD**  
1-812-837-0  
DCC-M5A, 100-11  
DCC-M5AP 1EX1



CAB-18 (SDRV)  
INTERIOR ONLY BETWEEN VTE AND CAMERA  
— TOP VIEW —



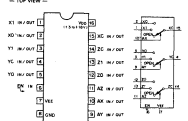
NUMERICAL-5 (LINC)  
OPERATIONAL ANALYZER  
— TOP VIEW —



NUMERICAL-5 (LINC)  
OPERATIONAL ANALYZER  
— TOP VIEW —

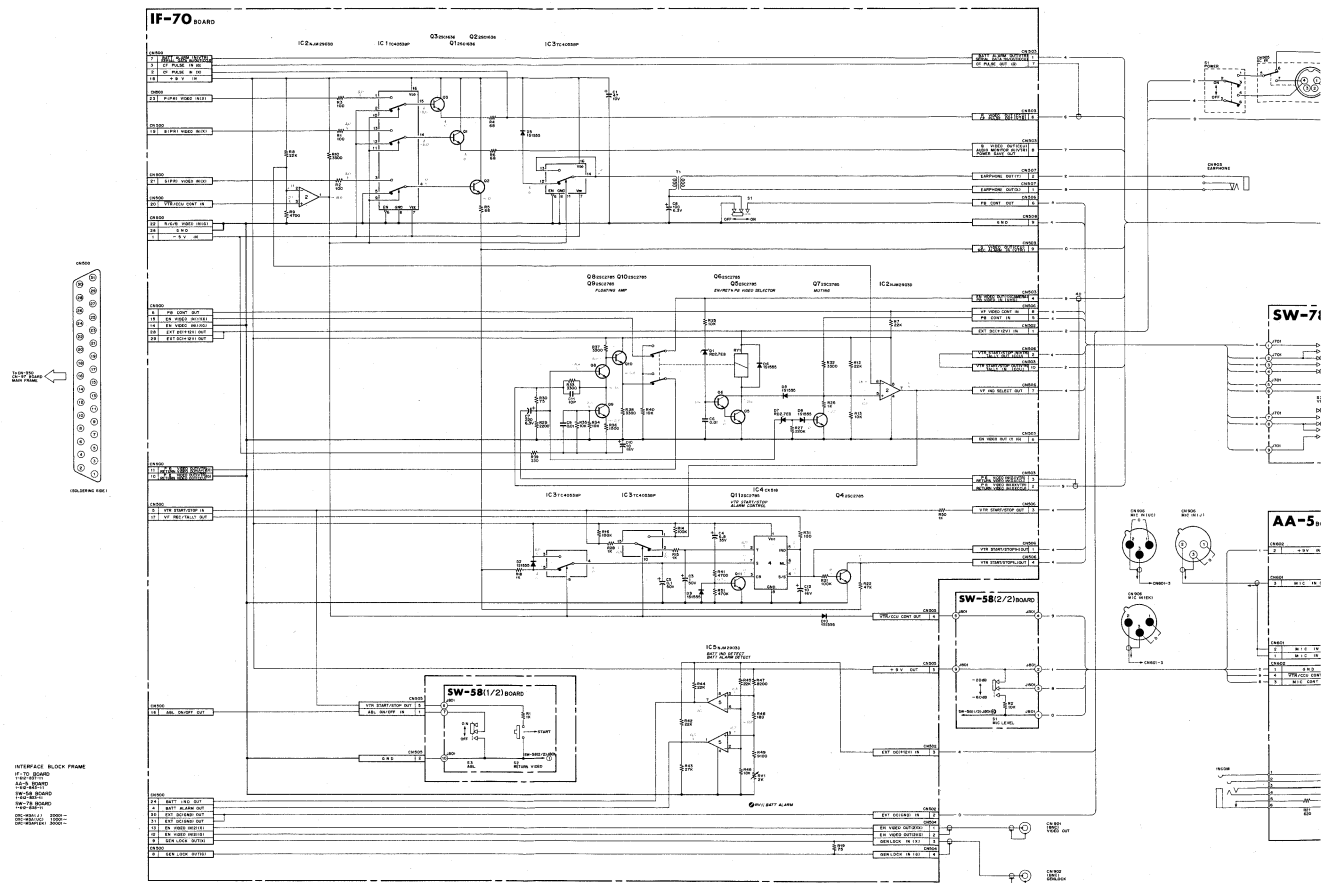


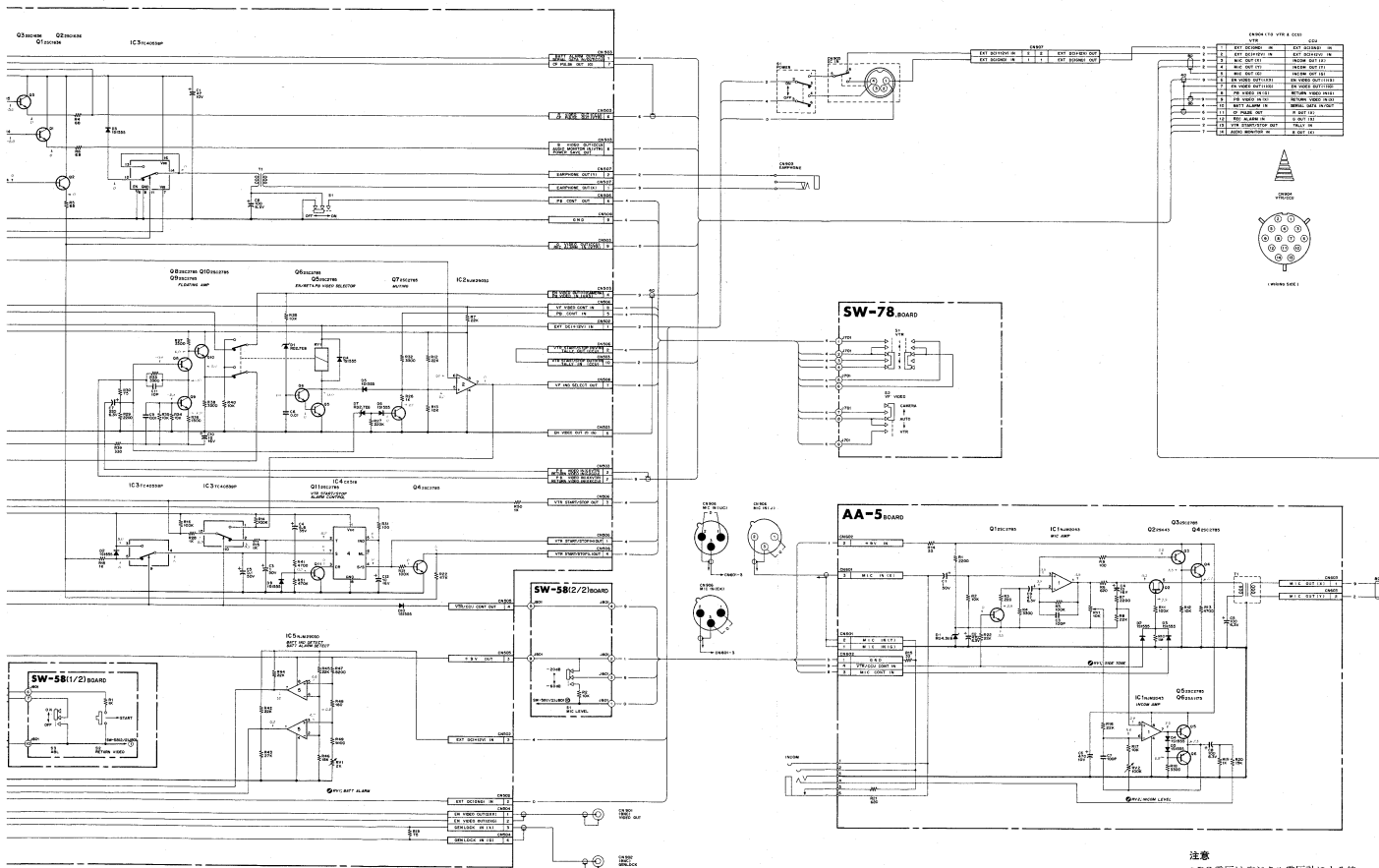
TRCOM-5 (TOSHIBA)  
C-MOS 2 CHANNEL MULTIFUNCTION MULTIPLEXER  
— TOP VIEW —



ONLY WELDED  
1-612-845-11, 1-612-845-12  
1-612-845-13  
1-612-845-14

INTERFACE FRAME  
IF-70 BOARD  
AA-5 BOARD  
SW-58 BOARD  
SW-78 BOARD





注意  
●DC 電圧はデジタル電圧計による値。

NOTE:  
All voltage are dc, measured with a digital volt meter (input resistance 10 MΩ).


## SECTION 6

### SPARE PARTS

#### 6-1. PARTS INFORMATION

##### Notes on Repair Parts

##### (1) Safety Related Components Warning

Components identified by shading marked with  on the exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

##### (2) Standardization of Parts

Repair parts supplied from Sony Parts Center may not be always identical with the part which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".

This manual's exploded views and electrical spare parts list are indicating the parts numbers of "the standardized genuine parts at present".

##### (3) Stock of Parts

Parts marked with ( ) on the spare parts list are not normally required for routine service work. Orders for parts marked with ( ) will be processed, but allow for additional delivery time.

##### (4) SCREW

TOTSU TYPE

	B	P	PSW
2.6x6	7-621-912-30		
2.6x8		7-621-909-55	7-621-981-25
3x6	7-686-624-04		7-686-527-01
3x6 (BZN)	7-686-624-09		
3x8	7-686-625-04		7-686-528-01
3x8 (BZN)	7-686-625-09		
3x10	7-686-626-09		7-686-529-01
3x12	7-686-627-09		7-686-530-01
4x10		7-686-636-09	
4x25		7-686-641-09	

RECISION TYPE

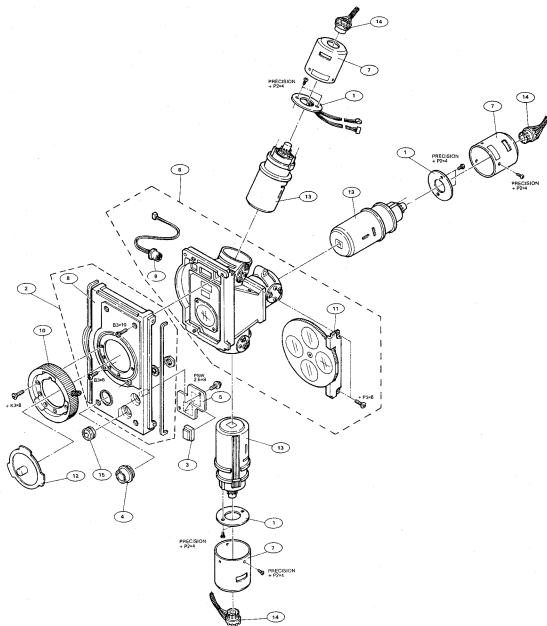
	+ P
1.7x3	7-621-552-37
1.7x3 (BZN)	7-621-552-38
2x4	7-672-553-48
2.6x8	7-627-556-97

HEXAGON HOLE BOLT

3x20	7-683-410-04
4x10	7-683-420-04
4x20	7-683-425-04

+ TYPE

	B	K	P	RK	PS
2x4	7-621-772-18				
2x6	7-621-772-38				
2.6x6			7-621-770-67	7-621-662-20	
2.6x8	7-621-775-40				
2.6x10			7-621-259-65		
3x6		7-682-247-09			7-682-650-01
3x8		7-682-248-04			

6-2. EXPLODED VIEW  
FRONT PANEL BLOCK

No.	Parts No.	Description
( ) 1	A-7511-926-A	MOUNTED CIRCUIT BOARD "PA-22"
( ) 2	X-3680-613-1	FRONT CHASSIS ASSY
3	1-553-739-00	SWITCH, KEY BOARD (S1, S2)
4	1-562-221-21	RECEPTACLE, 12P MALE "LENS"
( ) 5	1-612-842-00	PRINTED, CIRCUIT BOARD "SW-70"

No.	Parts No.	Description
( ) 6	1-547-118-11	PRISM (OPTICAL) PY-07
( ) 7	3-680-610-00	CAP, PA SHIELD
8	3-680-670-01	RUBBER(A), SHIELD
9	3-706-791-00	LAMP, BIAS, LIGHT
( ) 10	3-706-792-00	BAYONET MOUNT
( ) 11	3-706-794-00	DISC UNIT, FILTER
( ) 12	3-706-795-00	CAP, MOUNT
13	8-701-023-38	PICKUP TUBE (CT-2332A)
14	1-934-096-11	8P PLUG WITH HARNESS
15	3-676-244-00	COVER, SWITCH



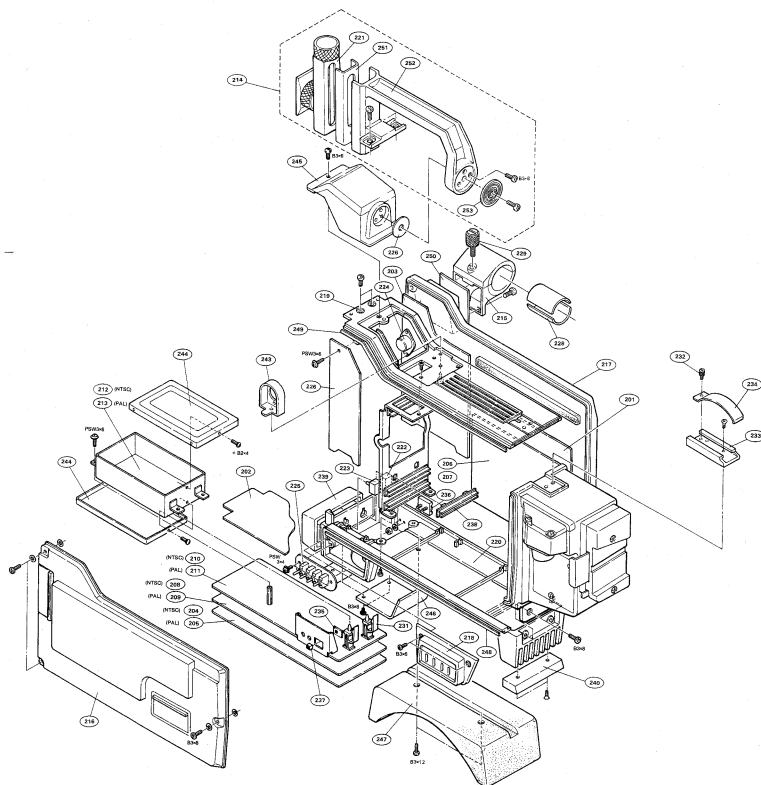
## CHASSIS BLOCK

## DXC-M3A/M3AP

## DXC-M3A/M3AP

## CHASSIS BLOCK

## CHASSIS BLOCK



No.	Parts No.	Description	No.	Parts No.	Description
( ) 201	A-7512-084-A	MOUNTED CIRCUIT BOARD "AT-31"	( ) 226	1-610-094-13	MOUNTED CIRCUIT BOARD "PS-26"
( ) 202	A-7511-930-A	MOUNTED CIRCUIT BOARD "PS-15"	228	3-657-643-03	CUSHION, MICROPHONE
( ) 203	A-7511-932-A	MOUNTED CIRCUIT BOARD "DF-20"	229	3-657-657-01	SCREW (M5)
( ) 204	A-7511-939-A	MOUNTED CIRCUIT BOARD "IE-7" (NTSC)	( ) 230	3-659-101-00	BUSHING, INSULATING
( ) 205	A-7511-940-A	MOUNTED CIRCUIT BOARD "IE-7" (PAL)	( ) 231	3-661-654-00	HOLDER, PC BOARD
( ) 206	A-7513-082-A	MOUNTED CIRCUIT BOARD "CN-97" (NTSC)	( ) 232	3-664-213-00	SCREW, STOPPER
( ) 207	A-7513-083-A	MOUNTED CIRCUIT BOARD "CN-97" (PAL)	( ) 233	3-664-218-00	SHOE
( ) 208	A-7513-085-A	MOUNTED CIRCUIT BOARD "PR-61" (NTSC)	( ) 234	3-664-228-00	PLATE, SPRING
( ) 209	A-7513-086-A	MOUNTED CIRCUIT BOARD "PR-61" (PAL)	( ) 235	3-680-604-11	PLATE, BLIND
( ) 210	A-7513-094-A	MOUNTED CIRCUIT BOARD "EN-28A" (NTSC)	236	3-686-244-01	CABLE, CLAMP
( ) 211	A-7513-094-A	MOUNTED CIRCUIT BOARD "EN-28A" (PAL)	( ) 237	3-680-605-00	CAP, SLIDE
( ) 212	A-7513-095-A	MOUNTED CIRCUIT BOARD "SG-1A" (NTSC)	( ) 238	3-680-613-00	SUPPORT, PC BOARD
( ) 213	A-7513-097-A	MOUNTED CIRCUIT BOARD "SG-1A" (PAL)	( ) 239	3-680-622-11	SWITCH, COVER FRONT
( ) 214	A-7420-098-A	HANDLE ASSY	( ) 240	3-680-630-00	CHIP, LOCK ADAPTOR
215	X-3680-612-1	HOLDER ASSY, MICROPHON	( ) 243	3-680-642-11	BOX, DIN CN
( ) 216	X-3680-618-1	PLATE (RIGHT) ASSY, SIDE	( ) 244	3-680-646-00	LID, SG SHIELD
( ) 217	X-3680-616-1	PLATE (LEFT) ASSY, SIDE	( ) 246	3-680-673-11	COVER (LOWER), TUBE
( ) 218	X-3680-610-1	COVER ASSY, SIDE SWITCH	( ) 247	3-680-658-00	PAD, SHOULDER
( ) 219	X-3680-611-2	CHASSIS ASSY (UPPER)	248	3-680-672-01	RUBBER(E), SHIELD
( ) 220	X-3686-210-1	CHASSIS ASSY (LOWER)	249	3-680-674-01	RUBBER(B), SHIELD
( ) 221	X-3686-211-1	SLIDER ASSY	( ) 250	3-686-217-00	INSULATOR
222	1-554-486-00	SWITCH, TOGGLE "CONT MEMO" (S2)	( ) 251	3-686-238-01	SHEET (A)
223	1-553-430-00	SWITCH, TOGGLE "W/BAL" (S1)	( ) 252	3-686-243-01	HANDLE
224	1-561-320-00	DIN SOCKET BP	( ) 253	3-686-240-01	CAP, ORNAMENTAL
( ) 225	1-610-097-00	PRINTED CIRCUIT BOARD "SW-99"			

This exploded view diagram illustrates the assembly of a refrigerator door. The components are labeled with callout numbers 301 through 328. The diagram shows the door's internal structure, including the hinge mechanism (307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328) and the outer door panel (301, 302, 303, 304, 305, 306). The door is shown in an open position, revealing the internal components and the hinge mechanism. The diagram is a technical drawing with dashed lines indicating the assembly path and alignment of the parts.

6-6

## 6-3. ELECTRICAL PARTS LIST

Parts that are not listed in the "reference numbers order list" are shown in following table.

Reference numbers are omitted.

## CAPACITOR

## ABBREVIATION

Ref.No.	DESCRIPTION	Ref.No.	DESCRIPTION	Ref.No.	DESCRIPTION
BPF	FILTER	L	INDUCTOR	S	SWITCH
C	CAPACITOR	LV	VARIABLE INDUCTOR	T	TRANSFORMER
CN	CONNECTOR	Q	TRANSISTOR	TH	THERMISTOR
D	DIODE	R	RESISTOR	VCO	OSCILLATOR
DL	DELAY LINE	RP	RESISTOR BLOCK	VDR	VARISTOR
F	FUSE	RV	VARIABLE RESISTOR	X	CRYSTAL
IC	IC	RY	RELAY		

## CHIP CERAMIC CAPACITOR



220pF through 0.018 $\mu$ F(B)  $\pm$  10% 50WV

0.022 $\mu$ F through 0.068 $\mu$ F(F)  $\begin{matrix} +80 \\ -20 \end{matrix}$  % 50WV

Parts No. 1-163-□□□-00

Value	Parts No. - □□□ -
100pF	—
120	—
150	—
180	—
220	001
270	002
330	003
390	004
470	005
560	006
680	007
820	008

Value	Parts No. - □□□ -
0.001 $\mu$ F	009
0.0012	010
0.0015	011
0.0018	012
0.0022	013
0.0027	014
0.0033	015
0.0039	016
0.0047	017
0.0056	018
0.0068	019
0.0082	020

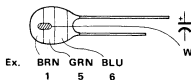
Value	Parts No. - □□□ -
0.01 $\mu$ F	021
0.012	022
0.015	023
0.018	024
0.022	033
0.027	—
0.033	034
0.039	—
0.047	035
0.056	—
0.068	036
0.082	—

## TANTALUM CAPACITOR



0.01 $\mu$ F through 100 $\mu$ F  $\pm$  10%  
3.15V through 35V

NOTE: The value of the parts that are marked with \* in the below table are indicated by color code. (to the value with  $\pm$  20%)



Working Voltage Color Code

Ex. BRN GRN BLU  
1 5 6

15  $\times$  10<sup>6</sup> pF = 15 $\mu$ F

BLK RED YEL GRN BLU GRY WHT

10V 35 6.3 16 20 25 3.15

Parts No. 1-131-□□□-00

Value	Parts No. -□□□-
0.01 $\mu$	35V *396
0.015	35 *397
0.022	35 *398
0.033	35 *399
0.047	35 *400
0.068	35 *401
0.1	35 341
0.15	35 342
0.22	35 343
0.33	25 *409
	35 344
0.47	20 *412
	35 345
0.68	16 *415
	25 *410
	35 346
1.0	10 *418
	25 498

Value	Parts No. -□□□-
1.0 $\mu$	35V 347
1.5	6.3 *421
	20 499
	25 354
	35 348
2.2	3.15 *424
	16 500
	20 361
	25 355
	35 349
3.3	10 501
	16 368
	20 362
	25 356
	35 350
4.7	6.3 502
	10 375
	16 369

Value	Parts No. -□□□-
4.7 $\mu$	20V 363
	25 357
	35 351
6.8	3.15 503
	6.3 382
	10 376
	16 370
	20 364
	25 358
	35 352
10	3.15 389
	6.3 383
	10 377
	16 371
	20 365
	25 359
	35 353
15	3.15 390
	6.3 384

Value	Parts No. -□□□-
15 $\mu$	10V 378
	16 372
	20 366
	25 360
22	3.15 391
	6.3 385
	10 379
	16 373
	20 367
33	3.15 392
	6.3 386
	10 380
	16 374
47	3.15 393
	6.3 387
	10 381
68	3.15 394
	6.3 388
100	3.15 395

## INDUCTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.

Reference numbers are omitted.

## MICRO INDUCTOR

1  $\mu$ H through 470  $\mu$ H  
 $\pm 5\%$

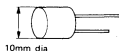


Parts No. 1-407-□□□-XX

Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
1 $\mu$ H	178	4.7 $\mu$ H	186	22 $\mu$ H	161	100 $\mu$ H	169
1.2	179	5.6	187	27	162	120	170
1.5	180	6.8	188	33	163	150	171
1.8	181	8.2	189	39	164	180	172
2.2	182	10	157	47	165	220	173
2.7	183	12	158	56	166	270	174
3.3	184	15	159	68	167	330	175
3.9	185	18	160	82	168	390	176
						470	177

## MICRO INDUCTOR

470  $\mu$ H through 33 mH  
 $\pm 5\%$



Parts No. 1-407-□□□-00

Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
470 $\mu$ H	488	1.5 mH	494	4.7 mH	500	15 mH	506
560	489	1.8	495	5.6	501	18	507
680	490	2.2	496	6.8	502	22	508
820	491	2.7	497	8.2	503	27	509
1 mH	492	3.3	498	10	504	33	510
1.2	493	3.9	499	12	505		

## RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.  
Reference numbers are omitted.

## CHIP RESISTOR



±5% 1/10W  
2.2Ω through 3.3MΩ

Parts No. 1-216-□□□-00

Value	Parts No. - □□□ -	Value	Parts No. - □□□ -	Value	Parts No. - □□□ -	Value	Parts No. - □□□ -	Value	Parts No. - □□□ -
1Ω	—	33Ω	013	1kΩ	049	33kΩ	085	1MΩ	121
1.1	—	36	014	1.1	050	36	086	1.1	122
1.2	—	39	015	1.2	051	39	087	1.2	123
1.3	—	43	016	1.3	052	43	088	1.3	124
1.5	—	47	017	1.5	053	47	089	1.5	125
1.6	—	51	018	1.6	054	51	090	1.6	126
1.8	—	56	019	1.8	055	56	091	1.8	127
2	—	62	020	2	056	62	092	2	128
2.2	298	68	021	2.2	057	68	093	2.2	129
2.4	301	75	022	2.4	058	75	094	2.4	130
2.7	302	82	023	2.7	059	82	095	2.7	131
3	303	91	024	3	060	91	096	3	132
3.3	304	100Ω	025	3.3	061	100kΩ	097	3.3	133
3.6	305	110	026	3.6	062	110	098		
3.9	306	120	027	3.9	063	120	099		
4.3	307	130	028	4.3	064	130	100		
4.7	308	150	029	4.7	065	150	101		
5.1	297	160	030	5.1	066	160	102		
5.6	309	180	031	5.6	067	180	103		
6.2	310	200	032	6.2	068	200	104		
6.8	311	220	033	6.8	069	220	105		
7.5	312	240	034	7.5	070	240kΩ	106		
8.2	313	270	035	8.2	071	270	107		
9.1	314	300	036	9.1	072	300	108		
10Ω	001	330	037	10kΩ	073	330	109		
11	002	360	038	11	074	360	110		
12	003	390	039	12	075	390	111		
13	004	430	040	13	076	430	112		
15	005	470	041	15	077	470	113		
16	006	510	042	16	078	510	114		
18	007	560	043	18	079	560	115		
20	008	620	044	20	080	620	116		
22	009	680	045	22	081	680	117		
24	010	750	046	24	082	750	118		
27	011	820	047	27	083	820	119		
30	012	910	048	30	084	910	120		

## CARBON RESISTOR (1/6W)

±5%, 1/6W, non-special type  
2.2Ω through 1MΩ



Parts No. 1-247-□□□-00

Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-	Value	Parts No. -□□□-
1Ω	-	36Ω	796	1.2kΩ	833	43kΩ	870
1.1	-	39	797	1.3	834	47	871
1.2	-	43	798	1.5	835	51	872
1.3	-	47	799	1.6	836	56	873
1.5	-	51	800	1.8	837	62	874
1.6	-	56	801	2	838	68	875
1.8	-	62	802	2.2	839	75	876
2	-	68	803	2.4	840	82	877
2.2	767	75	804	2.7	841	91	878
2.4	768	82	805	3	842	100kΩ	879
2.7	769	91	806	3.3	843	110	880
3	770	100Ω	807	3.6	844	120	881
3.3	771	110	808	3.9	845	130	882
3.6	772	120	809	4.3	846	150	883
3.9	773	130	810	4.7	847	160	884
4.3	774	150	811	5.1	848	180	885
4.7	775	160	812	5.6	849	200	886
5.1	776	180	813	6.2	850	220	887
5.6	777	200	814	6.8	851	240	888
6.2	778	220	815	7.5	852	270	889
6.8	779	240	816	8.2	853	300	890
7.5	780	270	817	9.1	854	330	891
8.2	781	300	818	10kΩ	855	360	892
9.1	782	330	819	11	856	390	893
10Ω	783	360	820	12	857	430	894
11	784	390	821	13	858	470	895
12	785	430	822	15	859	510	896
13	786	470	823	16	860	560	897
15	787	510	824	18	861	620	898
16	788	560	825	20	862	680	899
18	789	620	826	22	863	750	900
20	790	680	827	24	864	820	901
22	791	750	828	27	865	910	902
24	792	820	829	30	866	1MΩ	903
27	793	910	830	33	867		
30	794	1kΩ	831	36	868		
33	795	1.1	832	39	869		

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
AT-31	BOARD		C47	1-125-299-00	ELECT 0.047F 5.5V
( ) A-7513-084-A	PRINTED CIRCUIT BOARD		C48	1-163-141-00	CERAMIC CHIP 0.001
	"AT-31"				10% 50V
			C49	1-163-251-00	CERAMIC CHIP 100PF
					5% 50V
C1	1-123-622-00	ELECT 22 20% 16V	C61	1-123-318-00	ELECT 33 20% 16V
C2	1-123-306-00	ELECT 47 20% 10V	C62	1-123-645-00	ELECT 33 20% 10V
C3	1-123-306-00	ELECT 47 20% 10V			
C4	1-123-306-00	ELECT 47 20% 10V	CN401	1-562-308-00	RECEPTACLE, 36P FEMALE
C5	1-123-306-00	ELECT 47 20% 10V	CN403 ( )	1-564-018-11	RECEPTACLE, 8P MALE
			( )	1-562-153-00	PLUG HOUSING 8P
C6	1-123-306-00	ELECT 47 20% 10V	( )	1-564-026-00	PLUG CONTACT
C7	1-163-237-00	CERAMIC CHIP 27PF	CN403 ( )	1-564-016-00	RECEPTACLE, 6P MALE
		5% 50V	( )	1-562-151-00	PLUG HOUSING 6P
C9	1-123-617-00	ELECT 10 20% 16V	( )	1-564-026-00	PLUG CONTACT
C10	1-163-251-00	CERAMIC CHIP 100PF			
		5% 50V			
C14	1-123-318-00	ELECT 33 20% 16V	D1	8-719-100-05	1S2837
C15	1-123-617-00	ELECT 10 20% 16V	D2	8-719-100-05	1S2837
C16	1-123-617-00	ELECT 10 20% 16V	D3	8-719-100-03	1S2835
C17	1-123-645-00	ELECT 33 20% 10V	D4	8-719-100-05	1S2837
C24	1-123-644-00	ELECT 22 20% 10V	D5	8-719-100-05	1S2837
C25	1-123-645-00	ELECT 33 20% 10V			
			D6	8-719-100-03	1S2835
C26	1-123-306-00	ELECT 47 20% 10V	D7	8-719-100-03	1S2835
C27	1-123-611-00	ELECT 1 20% 50V	D8	8-719-100-05	1S2837
C28	1-123-661-00	ELECT 100 20% 6.3V	D9	8-719-100-05	1S2837
C29	1-163-259-00	CERAMIC CHIP 220PF	D10	8-719-100-05	1S2837
		5% 50V			
C30	1-123-306-00	ELECT 47 20% 10V	D11	8-719-100-05	1S2837
			D12	8-719-100-03	1S2835
C31	1-123-611-00	ELECT 1 20% 50V	D13	8-719-100-03	1S2835
C32	1-123-332-00	ELECT 47 20% 16V	D14	8-719-100-03	1S2835
C33	1-123-616-00	ELECT 4.7 20% 25V	D15	8-719-100-03	1S2835
C34	1-123-616-00	ELECT 4.7 20% 25V			
C35	1-123-616-00	ELECT 4.7 20% 25V	D17	8-719-100-03	1S2835
			D18	8-719-162-07	RD6.2EB
C36	1-123-616-00	ELECT 4.7 20% 25V	D19	8-719-101-23	1S123
C37	1-123-617-00	ELECT 10 20% 16V	D20	8-719-100-05	1S2837
C38	1-123-611-00	ELECT 1 20% 50V	D21	8-719-100-03	1S2835
C39	1-123-306-00	ELECT 47 20% 10V			
C40	1-123-332-00	ELECT 47 20% 16V	D22	8-719-100-03	1S2835
			D23	8-719-100-03	1S2835
C41	1-163-141-00	CERAMIC CHIP 0.001	D24	8-719-100-03	1S2835
		10% 50V	D25	8-719-100-05	1S2837
C42	1-163-141-00	CERAMIC CHIP 0.001 10%	D26	8-719-100-05	1S2837
		10% 50V			
C43	1-163-141-00	CERAMIC CHIP 0.001 10%	D27	8-719-100-05	1S2837
		10% 50V	D28	8-719-100-05	1S2837
C44	1-163-141-00	CERAMIC CHIP 0.001 10%	D29	8-719-100-03	1S2835
		10% 50V	D30	8-719-100-03	1S2835
C45	1-123-614-00	ELECT 3.3 20% 35V	D31	8-719-100-03	1S2835
			D32	8-719-100-05	1S2837
			D33	8-719-815-55	1S1555



Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
IC1	8-759-240-53	TC4053BP: TOSHIBA	Q26	8-729-100-76	2SA812
IC2	8-759-240-53	TC4053BP: TOSHIBA	Q27	8-729-100-66	2SC1623
IC3	8-759-990-62	TL062CP: TI	Q28	8-729-100-66	2SC1623
IC4	8-759-131-10	uPC311C: NEC	Q29	8-729-100-66	2SC1623
IC5	8-759-729-03	NJM2903D: JRC	Q30	8-729-100-66	2SC1623
			Q31	8-729-100-76	2SA812
IC6	8-759-240-53	TC4053BP: TOSHIBA			
IC7	8-759-969-13	SN16913P: TI			
IC8	8-759-909-96	LM711CH: NS			
IC9	8-759-240-29	TC4029BP: TOSHIBA	R58	1-215-468-00	METAL 91K 1% 1/6W
IC10	8-759-900-64	TL064CN: TI	R59	1-215-409-00	METAL 330 1% 1/6W
			R60	1-215-389-00	METAL 47 1% 1/6W
IC11	8-759-240-53	TC4053BP: TOSHIBA	R63	1-215-438-00	METAL 5.1K 1% 1/6W
IC12	8-759-990-82	TL082CP: TI	R129	1-215-469-00	METAL 100K 1% 1/6W
IC13	8-759-240-69	TC4069UBP: TOSHIBA			
IC14	8-759-240-69	TC4069UBP: TOSHIBA			
IC15	8-759-302-74	HD44860B03: HITACHI			
			RP1	1-231-387-00	NETTY
IC16	8-759-400-07	MN1227A: PANASONIC			
IC17	8-741-117-90	EX1179: SONY			
IC18	8-741-117-90	EX1179: SONY			
IC19	8-759-240-01	TC4001BP: TOSHIBA	RV1	1-228-892-00	METAL 22K
			RV2	1-228-889-00	METAL 2.2K
			RV3	1-228-889-00	METAL 2.2K
			RV4	1-228-888-00	METAL 1K
			RV5	1-228-896-00	METAL 220K
Q1	8-729-100-76	2SA812			
Q2	8-729-100-76	2SA812			
Q3	8-729-100-76	2SA812			
Q4	8-729-100-66	2SC1623	S1	1-554-168-00	SLIDE
Q5	8-729-100-66	2SC1623	S2	1-554-168-00	SLIDE
			S3	1-553-510-00	SLIDE
Q6	8-729-100-66	2SC1623			
Q7	8-729-100-66	2SC1623			
Q8	8-729-100-66	2SC1623			
Q9	8-729-100-66	2SC1623			
Q10	8-729-100-66	2SC1623			
Q11	8-729-100-66	2SC1623			
Q12	8-729-100-66	2SC1623			
Q13	8-729-100-76	2SA812			
Q14	8-729-100-66	2SC1623			
Q15	8-729-109-44	2SK94			
Q16	8-729-100-66	2SC1623			
Q17	8-729-100-66	2SC1623			
Q18	8-729-100-66	2SC1623			
Q19	8-729-100-66	2SC1623			
Q20	8-729-175-73	2SC2757			
Q21	8-729-175-73	2SC2757			
Q22	8-729-100-76	2SA812			
Q23	8-729-100-66	2SC1623			
Q24	8-729-100-76	2SA812			
Q25	8-729-100-66	2SC1623			

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
DF-20 BOARD			C55	1-123-611-00	ELECT 1 20% 50V
			C56	1-130-471-00	MYLAR 0.001 5% 50V
			C57	1-123-611-00	ELECT 1 20% 50V
			C58	1-130-471-00	MYLAR 0.001 5% 50V
			C59	1-123-611-00	ELECT 1 20% 50V
A ( ) A-7511-932-A MOUNTED CIRCUIT BOARD "DF-20"			C60	1-130-471-00	MYLAR 0.001 5% 50V
C2	1-107-202-00	MICA 10PF 5% 500V	C61	1-123-611-00	ELECT 1 20% 50V
C7	1-102-110-00	CERAMIC 220PF 10% 50V	C62	1-123-607-00	ELECT 0.1 20% 50V
C8	1-107-169-00	MICA 100PF 5% 500V	C63	1-123-607-00	ELECT 0.1 20% 50V
C9	1-124-452-00	ELECT 4.7 20% 200V	C64	1-123-617-00	ELECT 10 20% 16V
C10	1-102-110-00	CERAMIC 220PF 10% 50V	C65	1-123-617-00	ELECT 10 20% 16V
C13	1-107-169-00	MICA 100PF 5% 500V	C66	1-123-610-00	ELECT 0.47 20% 50V
C14	1-123-611-00	ELECT 1 20% 50V	C67	1-161-467-00	CERAMIC 470PF 5% 50V
C15	1-123-607-00	ELECT 0.1 20% 50V	C68	1-123-610-00	ELECT 0.47 20% 50V
C16	1-123-607-00	ELECT 0.1 20% 50V	C69	1-130-489-00	MYLAR 0.033 5% 50V
C17	1-123-611-00	ELECT 1 20% 50V	C70	1-123-617-00	ELECT 10 20% 16V
C18	1-123-611-00	ELECT 1 20% 50V	C72	1-123-822-00	ELECT 47 20% 10V
C19	1-123-644-00	ELECT 22 20% 10V	C73	1-123-822-00	ELECT 47 20% 10V
C20	1-123-612-00	ELECT 2.2 20% 50V	C74	1-123-822-00	ELECT 47 20% 10V
C21	1-130-471-00	MYLAR 0.001 5% 50V	C75	1-130-471-00	MYLAR 0.001 5% 50V
C22	1-130-471-00	MYLAR 0.001 5% 50V	C76	1-161-043-00	CERAMIC 220PF 10% 50V
C23	1-130-471-00	MYLAR 0.001 5% 50V	C77	1-123-380-00	ELECT 1 20% 100V
C24	1-130-471-00	MYLAR 0.001 5% 50V	C78	1-123-613-00	ELECT 3.3 20% 50V
C25	1-123-607-00	ELECT 0.1 20% 50V	C79	1-123-816-00	ELECT 10 20% 50V
C26	1-123-607-00	ELECT 0.1 20% 50V	C80	1-123-822-00	ELECT 47 20% 10V
C27	1-123-929-00	ELECT 1 20% 160V	C81	1-124-139-00	ELECT 100 20% 16V
C29	1-123-611-00	ELECT 1 20% 50V	C82	1-102-110-00	CERAMIC 220PF 10% 50V
C30	1-123-380-00	ELECT 1 20% 100V	C83	1-123-607-00	ELECT 0.1 20% 50V
C31	1-123-384-00	ELECT 10 20% 100V	C84	1-123-607-00	ELECT 0.1 20% 50V
C32	1-130-493-00	MYLAR 0.0068 5% 50V	C85	1-123-607-00	ELECT 0.1 20% 50V
C33	1-130-489-00	MYLAR 0.0033 5% 50V	C86	1-123-607-00	ELECT 0.1 20% 50V
C34	1-123-929-00	ELECT 1 20% 160V	C87	1-130-479-00	MYLAR 0.0047 5% 50V
C35	1-123-929-00	ELECT 1 20% 160V	CN204 ( )	1-564-009-00	RECEPTACLE, 10P MALE
C36	1-123-929-00	ELECT 1 20% 160V	( )	1-562-155-00	PLUG HOUSING 10P
C37	1-123-611-00	ELECT 1 20% 50V	( )	1-564-026-00	PLUG CONTACT
C40	1-130-804-00	POLYESTER 0.047 5% 400V	CN205 ( )	1-564-009-00	RECEPTACLE, 10P MALE
C42	1-123-611-00	ELECT 1 20% 50V	( )	1-562-155-00	PLUG HOUSING 10P
C44	1-102-110-00	CERAMIC 220PF 10% 50V	( )	1-564-026-00	PLUG CONTACT
C45	1-130-804-00	POLYESTER 0.047 5% 400V	CN206 ( )	1-564-009-00	RECEPTACLE, 10P MALE
C46	1-123-607-00	ELECT 0.1 20% 50V	( )	1-562-155-00	PLUG HOUSING 10P
C47	1-123-607-00	ELECT 0.1 20% 50V	( )	1-564-026-00	PLUG CONTACT
C48	1-123-607-00	ELECT 0.1 20% 50V	CN207 ( )	1-564-005-00	RECEPTACLE, 6P MALE
C49	1-102-110-00	CERAMIC 220PF 10% 50V	( )	1-562-151-00	PLUG HOUSING 6P
C51	1-123-607-00	ELECT 0.1 20% 50V	( )	1-564-026-00	PLUG CONTACT
C52	1-130-471-00	MYLAR 0.001 5% 50V	CN208 ( )	1-564-011-11	RECEPTACLE, 12P MALE
C53	1-123-622-00	ELECT 22 20% 16V	( )	1-562-157-00	PLUG HOUSING 12P
			( )	1-564-026-00	PLUG CONTACT

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
CN209 ( )	1-564-008-00	RECEPTACLE, 9P MALE	Q12	8-729-117-54	2SA1175
( )	1-562-154-00	PLUG HOUSING 9P	Q13	8-729-110-53	2SA1005
( )	1-564-026-00	PLUG CONTACT	Q14	8-729-163-93	2SA639S
			Q15	8-729-103-82	2SC1279S
			Q16	8-729-364-12	2SC641K
D1	8-719-815-55	1S1555	Q17	8-729-103-82	2SC1279S
D2	8-719-815-55	1S1555	Q18	8-729-103-82	2SC1279S
D3	8-719-815-55	1S1555	Q19	8-729-163-93	2SA639S
D4	8-719-815-55	1S1555	Q20	8-769-194-00	2SK43-4
D5	8-719-815-55	1S1555	Q21	8-729-117-54	2SA1175
D6	8-719-815-55	1S1555	Q22	8-729-117-54	2SA1175
D7	8-719-815-55	1S1555	Q23	8-729-117-54	2SA1175
D8	8-719-815-55	1S1555	Q25	8-729-178-54	2SC2785
D9	8-719-815-55	1S1555	Q26	8-729-117-54	2SA1175
D11	8-719-815-55	1S1555	Q27	8-729-117-54	2SA1175
D12	8-719-815-55	1S1555	Q28	8-729-163-93	2SA639S
IC1	8-759-240-01	TC4001BP: TOSHIBA	R10	1-215-488-00	METAL 620K 1% 1/6W
IC2	8-743-690-00	BX369: SONY	R14	1-215-477-00	METAL 220K 1% 1/6W
IC4	8-741-105-30	BX1053: SONY	R22	1-215-474-00	METAL 160K 1% 1/6W
IC5	8-741-105-30	BX1053: SONY	R23	1-215-452-00	METAL 20K 1% 1/6W
IC6	8-759-940-98	CD4098BE: RCA	R24	1-215-443-00	METAL 8.2K 1% 1/6W
IC7	8-743-690-00	BX369: SONY	R25	1-215-441-00	METAL 6.8K 1% 1/6W
IC8	8-741-105-30	BX1053: SONY	R26	1-215-452-00	METAL 20K 1% 1/6W
IC9	8-759-990-84	TLO84CN: TI	R27	1-215-443-00	METAL 8.2K 1% 1/6W
IC10	8-741-105-30	BX1053: SONY	R28	1-215-441-00	METAL 6.8K 1% 1/6W
IC11	8-759-990-84	TLO84CN: TI	R29	1-215-452-00	METAL 20K 1% 1/6W
IC12	8-759-990-84	TLO84CN: TI	R30	1-215-443-00	METAL 8.2K 1% 1/6W
IC13	8-759-240-53	TC4053BP: TOSHIBA	R31	1-215-441-00	METAL 6.8K 1% 1/6W
			R32	1-215-452-00	METAL 20K 1% 1/6W
			R33	1-215-443-00	METAL 8.2K 1% 1/6W
			R34	1-215-441-00	METAL 6.8K 1% 1/6W
L2	1-407-506-00	MICRO 15M	R40	1-215-457-00	METAL 33K 1% 1/6W
			R41	1-215-451-00	METAL 18K 1% 1/6W
			R47	1-215-487-00	METAL 560K 1% 1/6W
Q2	8-729-178-54	2SC2785	R53	1-215-439-00	METAL 5.6K 1% 1/6W
Q3	8-729-103-82	2SC1279S	R54	1-215-469-00	METAL 100K 1% 1/6W
Q4	8-729-163-93	2SA639S			
Q5	8-729-103-82	2SC1279S	R55	1-215-433-00	METAL 3.3K 1% 1/6W
Q6	8-729-163-93	2SA639S	R66	1-215-434-00	METAL 3.6K 1% 1/6W
			R67	1-215-434-00	METAL 3.6K 1% 1/6W
Q7	8-729-603-50	2SC403SP	R68	1-215-434-00	METAL 3.6K 1% 1/6W
Q8	8-729-603-50	2SC403SP	R69	1-215-434-00	METAL 3.6K 1% 1/6W
Q9	8-729-178-54	2SC2785			
Q10	8-729-117-54	2SA1175	R70	1-215-457-00	METAL 33K 1% 1/6W
Q11	8-729-178-54	2SC2785	R71	1-215-457-00	METAL 33K 1% 1/6W
			R72	1-215-434-00	METAL 3.6K 1% 1/6W
			R73	1-215-434-00	METAL 3.6K 1% 1/6W
			R74	1-215-434-00	METAL 3.6K 1% 1/6W

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
R75	1-215-434-00	METAL 3.6K 1% 1/6W	R126	1-215-445-00	METAL 10K 1% 1/6W
R76	1-215-457-00	METAL 33K 1% 1/6W	R127	1-215-445-00	METAL 10K 1% 1/6W
R77	1-215-457-00	METAL 33K 1% 1/6W	R128	1-215-445-00	METAL 10K 1% 1/6W
R81	1-215-493-00	METAL 1M 1% 1/6W	R129	1-215-443-00	METAL 8.2K 1% 1/6W
R82	1-215-457-00	METAL 33K 1% 1/6W	R130	1-215-443-00	METAL 8.2K 1% 1/6W
R83	1-215-457-00	METAL 33K 1% 1/6W	R131	1-215-445-00	METAL 10K 1% 1/6W
R84	1-215-493-00	METAL 1M 1% 1/6W	R132	1-215-445-00	METAL 10K 1% 1/6W
R85	1-215-467-00	METAL 82K 1% 1/6W	R133	1-215-445-00	METAL 10K 1% 1/6W
R86	1-215-467-00	METAL 82K 1% 1/6W	R134	1-215-443-00	METAL 8.2K 1% 1/6W
R87	1-215-451-00	METAL 18K 1% 1/6W	R136	1-215-443-00	METAL 8.2K 1% 1/6W
R88	1-215-451-00	METAL 18K 1% 1/6W	R137	1-215-445-00	METAL 10K 1% 1/6W
R89	1-215-461-00	METAL 47K 1% 1/6W	R138	1-215-445-00	METAL 10K 1% 1/6W
R90	1-215-461-00	METAL 47K 1% 1/6W	R139	1-215-445-00	METAL 10K 1% 1/6W
R91	1-215-461-00	METAL 47K 1% 1/6W	R140	1-215-443-00	METAL 8.2K 1% 1/6W
R92	1-215-453-00	METAL 22K 1% 1/6W	R146	1-215-451-00	METAL 18K 1% 1/6W
R93	1-215-469-00	METAL 100K 1% 1/6W	R147	1-215-451-00	METAL 18K 1% 1/6W
R94	1-215-469-00	METAL 100K 1% 1/6W	R148	1-215-451-00	METAL 18K 1% 1/6W
R95	1-215-469-00	METAL 100K 1% 1/6W	R150	1-215-469-00	METAL 100K 1% 1/6W
R97	1-215-488-00	METAL 620K 1% 1/6W	R152	1-215-469-00	METAL 100K 1% 1/6W
R98	1-215-477-00	METAL 220K 1% 1/6W	R153	1-215-469-00	METAL 100K 1% 1/6W
R99	1-215-477-00	METAL 220K 1% 1/6W	R159	1-215-438-00	METAL 5.1K 1% 1/6W
R101	1-215-461-00	METAL 47K 1% 1/6W	R160	1-215-438-00	METAL 5.1K 1% 1/6W
R102	1-215-461-00	METAL 47K 1% 1/6W	R161	1-215-438-00	METAL 5.1K 1% 1/6W
R103	1-215-461-00	METAL 47K 1% 1/6W	R162	1-215-438-00	METAL 5.1K 1% 1/6W
R104	1-215-457-00	METAL 33K 1% 1/6W	R163	1-215-438-00	METAL 5.1K 1% 1/6W
R105	1-215-493-00	METAL 1M 1% 1/6W	R164	1-215-438-00	METAL 5.1K 1% 1/6W
R106	1-215-457-00	METAL 33K 1% 1/6W	R165	1-215-438-00	METAL 5.1K 1% 1/6W
R107	1-215-493-00	METAL 1M 1% 1/6W	R166	1-215-438-00	METAL 5.1K 1% 1/6W
R108	1-215-451-00	METAL 18K 1% 1/6W			
R109	1-215-451-00	METAL 18K 1% 1/6W			
R110	1-215-469-00	METAL 100K 1% 1/6W	RV1	1-226-096-00	METAL 500K
R111	1-215-469-00	METAL 100K 1% 1/6W	RV2	1-224-940-00	METAL 10K
R112	1-215-461-00	METAL 47K 1% 1/6W	RV3	1-226-101-00	METAL 1M
R113	1-215-461-00	METAL 47K 1% 1/6W	RV4	1-226-096-00	METAL 500K
R114	1-215-461-00	METAL 47K 1% 1/6W	RV5	1-226-095-00	METAL 200K
R115	1-215-477-00	METAL 220K 1% 1/6W	RV6	1-224-940-00	METAL 10K
R116	1-215-476-00	METAL 200K 1% 1/6W	RV7	1-224-939-00	METAL 5K
R117	1-215-477-00	METAL 220K 1% 1/6W	RV8	1-226-698-00	METAL 10K
R118	1-215-476-00	METAL 200K 1% 1/6W	RV9	1-226-698-00	METAL 10K
R119	1-215-461-00	METAL 47K 1% 1/6W	RV10	1-226-698-00	METAL 10K
R120	1-215-461-00	METAL 47K 1% 1/6W	RV11	1-226-698-00	METAL 10K
R121	1-215-461-00	METAL 47K 1% 1/6W	RV12	1-228-894-00	METAL 47K
R122	1-215-459-00	METAL 39K 1% 1/6W	RV13	1-228-894-00	METAL 47K
R123	1-215-459-00	METAL 39K 1% 1/6W	RV14	1-228-894-00	METAL 47K
R125	1-215-443-00	METAL 8.2K 1% 1/6W	RV15	1-228-894-00	METAL 47K

Ref.No.	Part No.	Description
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RV16	1-228-894-00	METAL 47K
RV17	1-228-894-00	METAL 47K
RV18	1-228-894-00	METAL 47K
RV19	1-228-894-00	METAL 47K
RV20	1-228-894-00	METAL 47K

RV21	1-228-894-00	METAL 47K
RV22	1-228-894-00	METAL 47K
RV23	1-228-894-00	METAL 47K
RV24	1-228-894-00	METAL 47K
RV25	1-228-894-00	METAL 47K

RV26	1-228-894-00	METAL 47K
RV27	1-228-894-00	METAL 47K
RV28	1-228-894-00	METAL 47K
RV29	1-228-894-00	METAL 47K
RV30	1-228-894-00	METAL 47K

RV31	1-228-894-00	METAL 47K
RV32	1-228-894-00	METAL 47K
RV33	1-228-894-00	METAL 47K
RV34	1-228-894-00	METAL 47K
RV35	1-228-894-00	METAL 47K

RV36	1-228-894-00	METAL 47K
RV37	1-228-894-00	METAL 47K
RV38	1-228-894-00	METAL 47K
RV39	1-228-894-00	METAL 47K
RV40	1-228-891-00	METAL 10K

RV41	1-228-891-00	METAL 10K
RV42	1-228-891-00	METAL 10K
RV43	1-228-892-00	METAL 22K
RV44	1-228-892-00	METAL 22K

T1	1-433-219-00	COUPLING
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Ref.No.	Part No.	Description
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## EN-28A BOARD

( ) A-7513-094-A	MOUNTED	CIRCUIT BOARD "EN-28A" (NTSC)
( ) A-7513-095-A	MOUNTED	CIRCUIT BOARD "EN-28A" (PAL)

BPF1	1-235-161-00	BAND PASS 3.38MHz (NTSC)
BPF1	1-235-181-00	BAND PASS 4.43MHz (PAL)

C2	1-123-822-00	ELECT 47 20% 10V
C3	1-163-239-00	CERAMIC CHIP 33PF
C4	1-163-239-00	CERAMIC CHIP 33PF 5% 50V
C6	1-163-251-00	CERAMIC CHIP 100PF 5% 50V
C8	1-163-239-00	CERAMIC CHIP 33PF 5% 50V

C9	1-163-239-00	CERAMIC CHIP 33PF 5% 50V
C13	1-163-251-00	CERAMIC CHIP 100PF 5% 50V
C19	1-163-251-00	CERAMIC CHIP 100PF 5% 50V (NTSC)
C19	1-163-248-11	CERAMIC CHIP 75PF 5% 50V (PAL)
C20	1-163-251-00	CERAMIC CHIP 100PF 5% 50V (NTSC)

C20	1-163-248-11	CERAMIC CHIP 75PF 5% 50V (PAL)
C24	1-123-661-00	ELECT 100 20% 6.3V
C26	1-163-220-11	CERAMIC CHIP 3PF +0.25PF 50V
C27	1-163-224-00	CERAMIC CHIP 7PF +0.25PF 50V
C31	1-123-822-00	ELECT 47 20% 10V
C32	1-123-822-00	ELECT 47 20% 10V
C33	1-123-822-00	ELECT 47 20% 10V
C36	1-163-219-00	CERAMIC CHIP 2PF +0.25PF 50V
C41	1-124-287-00	ELECT 10 20% 10V
C46	1-123-617-00	ELECT 10 20% 16V

A TH1	1-202-860-00	100
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A TH2	1-202-862-00	220
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Ref.NO.	Part No.	Description	Ref.No.	Part No.	Description
C47	1-163-224-00	CERAMIC CHIP 7PF +0.25PF 50V	D1	8-719-100-03	1S2835
C48	1-123-617-00	ELECT 10 20% 16V	D2	8-719-100-03	1S2835
C50	1-163-249-00	CERAMIC CHIP 82PF	D3	8-719-101-23	1S2123
C56	1-163-259-00	CERAMIC CHIP 220PF 5% 50V (NTSC)	D4	8-719-100-03	1S2835
C57	1-130-471-00	MYLAR 0.001 5% 50V	D5	8-719-101-23	1S2123 (NTSC, PAL)
C58	1-163-097-00	CERAMIC CHIP 15PF 5% 50V	D6	8-719-100-03	1S2835 (NTSC)
C59	1-163-239-00	CERAMIC CHIP 33PF 5% 50V	D7	8-719-100-03	1S2835 (NTSC, PAL)
C60	1-123-822-00	ELECT 47 20% 10V	D8	8-719-100-03	1S2835
C61	1-163-251-00	CERAMIC CHIP 100PF 5% 50V	D9	8-719-100-03	1S2835
C62	1-163-261-11	CERAMIC CHIP 270PF 5% 50V (NTSC)	D10	8-719-101-23	1S2123
C62	1-163-259-00	CERAMIC CHIP 220PF 5% 50V (PAL)	D11	8-719-100-03	1S2835
C63	1-163-097-00	CERAMIC CHIP 15PF 5% 50V	DL2	1-415-370-11	340nS
C64	1-163-251-00	CERAMIC CHIP 100PF 5% 50V	IC1	8-759-906-59	CX22017: SONY
C65	1-163-248-11	CERAMIC CHIP 75PF 5% 50V	IC2	8-741-105-50	BX1055: SONY
C74	1-163-251-00	CERAMIC CHIP 100PF 5% 50V	IC3	8-759-909-96	LM711CH: NS
C76	1-123-617-00	ELECT 10 20% 16V (PAL)	IC4	8-749-931-50	BX315: SONY
C79	1-163-239-00	CERAMIC CHIP 33PF 5% 50V	IC6	8-759-145-58	uPC4558C: NEC
C80	1-163-259-00	CERAMIC CHIP 220PF 5% 50V (NTSC)	IC7	8-759-240-53	TC4053BP: TOSHIBA
C81	1-163-097-00	CERAMIC CHIP 15PF 5% 50V	IC8	8-759-240-53	TC4053BP: TOSHIBA
C82	1-163-259-00	CERAMIC CHIP 220PF 5% 50V (NTSC)	IC9	8-759-240-25	TC4025BP: TOSHIBA
CN1	1-560-041-00	RECEPTACLE, 31P MALE	IC10	8-759-140-17	uPD4017BC: NEC (NTSC)
CN2	( ) 1-564-007-00	RECEPTACLE, 8P MALE	IC11	8-759-200-21	TC40H107AP: TOSHIBA
	( ) 1-562-153-00	PLUG HOUSING 8P	IC13	8-759-000-01	MC74HC4538N: MOTOROLA
	( ) 1-564-026-00	PLUG CONTACT	IC14	8-759-045-57	MC14557BCP: MOTOROLA
CN3	( ) 1-564-007-00	RECEPTACLE, 8P MALE	IC15	8-759-220-00	TC40H000P: TOSHIBA
	( ) 1-562-153-00	PLUG HOUSING 8P	IC16	8-759-240-49	TC4049BP: TOSHIBA
	( ) 1-564-026-00	PLUG CONTACT	L1	1-408-413-00	MICRO 22
			L3	1-408-849-00	MICRO 330
			L4	1-408-849-00	MICRO 330
			L5	1-408-417-00	MICRO 47
			L10	1-408-413-00	MICRO 22
			L11	1-408-413-00	MICRO 22
			LV1	1-407-926-00	COIL 22
			LV2	1-408-844-00	22 (NTSC)
			LV2	1-408-845-00	100 (PAL)

Ref.NO.	Part NO.	Description	Ref.NO.	Part NO.	Description
Q1	8-729-100-66	2SC1623	R5	1-214-485-00	METAL 13.7K 1% 1/2W (PAL)
Q2	8-729-100-66	2SC1623	R6	1-214-502-00	METAL 2.67K 0.5% 1/4W (NTSC)
Q3	8-729-100-66	2SC1623	R6	1-214-482-00	METAL 2.55K 1% 1/2W (PAL)
Q4	8-729-100-76	2SA812	R8	1-215-438-00	METAL 5.1K 1% 1/6W
Q5	8-729-100-76	2SA812	R9	1-215-419-00	METAL 820 1% 1/6W (NTSC)
Q6	8-729-175-73	2SC2757	R9	1-215-421-00	METAL 1K 1% 1/6W (PAL)
Q7	8-729-100-66	2SC1623	R10	1-215-419-00	METAL 820 1% 1/6W (NTSC)
Q8	8-729-100-66	2SC1623	R10	1-215-421-00	METAL 1K 1% 1/6W (PAL)
Q9	8-729-100-66	2SC1623	R11	1-215-428-00	METAL 2K 1% 1/6W
Q10	8-729-100-66	2SC1623	R13	1-215-439-00	METAL 5.6K 1% 1/6W
Q11	8-729-100-76	2SA812	R14	1-215-425-00	METAL 1.5K 1% 1/6W
Q12	8-729-100-76	2SA812	R16	1-215-428-00	METAL 2K 1% 1/6W
Q13	8-729-175-73	2SC2757	R18	1-215-418-00	METAL 750 1% 1/6W
Q15	8-729-100-66	2SC1623	R19	1-215-437-00	METAL 4.7K 1% 1/6W (NTSC)
Q16	8-729-175-73	2SC2757	R19	1-215-441-00	METAL 6.8K 1% 1/6W (PAL)
Q17	8-729-100-66	2SC1623	R22	1-215-414-00	METAL 510 1% 1/6W
Q18	8-729-100-76	2SA812	R23	1-215-454-00	METAL 24K 1% 1/6W
Q19	8-729-100-66	2SC1623	R24	1-215-448-00	METAL 13K 1% 1/6W
Q21	8-729-100-76	2SA812	R25	1-215-433-00	METAL 3.3K 1% 1/6W
Q22	8-729-100-76	2SA812	R26	1-215-425-00	METAL 1.5K 1% 1/6W
Q28	8-729-100-66	2SC1623	R27	1-215-428-00	METAL 2K 1% 1/6W
Q29	8-729-100-66	2SC1623	R32	1-215-414-00	METAL 510 1% 1/6W
Q30	8-729-122-63	2SA1226 (NTSC)	R33	1-215-414-00	METAL 510 1% 1/6W
Q31	8-729-100-66	2SC1623 (NTSC)	R34	1-215-445-00	METAL 10K 1% 1/6W (NTSC)
Q32	8-729-100-66	2SC1623 (NTSC)	R34	1-215-441-00	METAL 6.8K 1% 1/6W (PAL)
Q33	8-729-100-66	2SC1623 (NTSC)	R36	1-215-421-00	METAL 1K 1% 1/6W
Q34	8-729-100-76	2SA812	R38	1-215-454-00	METAL 24K 1% 1/6W
Q35	8-729-100-76	2SA812	R40	1-215-414-00	METAL 510 1% 1/6W
Q36	8-729-100-66	2SC1623	R41	1-215-448-00	METAL 13K 1% 1/6W
Q37	8-729-100-66	2SC1623	R46	1-215-414-00	METAL 510 1% 1/6W
Q38	8-729-100-66	2SC1623	R47	1-215-431-00	METAL 2.7K 1% 1/6W
R1	1-214-483-00	METAL 4.99K 1% 1/2W (PAL)	R50	1-214-483-00	METAL 4.99K 1% 1/2W
R2	1-214-500-00	METAL 2.26K 0.5% 1/4W (NTSC)	R51	1-214-485-00	METAL 13.7K 1% 1/2W
R3	1-214-503-00	METAL 3.32K 0.5% 1/4W (NTSC)	R52	1-214-482-00	METAL 2.55K 1% 1/2W
R4	1-214-482-00	METAL 2.55K 1% 1/2W (PAL)	R53	1-215-437-00	METAL 4.7K 1% 1/6W
R5	1-214-501-00	METAL 2.32K 0.5% 1/4W (NTSC)			

Ref.NO.	Part NO.	Description	Ref.NO.	Part NO.	Description
R54	1-215-443-00	METAL 8.2K 1% 1/6W (NTSC)	RV1	1-228-887-00	METAL 470
R58	1-215-421-00	METAL 1K 1% 1/6W	RV2	1-228-889-00	METAL 2.2K
R59	1-215-445-00	METAL 10K 1% 1/6W	RV3	1-228-890-00	METAL 4.7K
R60	1-215-433-00	METAL 3.3K 1% 1/6W (NTSC)	RV4	1-228-889-00	METAL 2.2K
R60	1-215-434-00	METAL 3.6K 1% 1/6W (PAL)	RV5	1-228-890-00	METAL 4.7K
R61	1-215-420-00	METAL 910 1% 1/6W	RV6	1-228-892-00	METAL 22K (NTSC)
R62	1-215-449-00	METAL 15K 1% 1/6W	RV7	1-228-888-00	METAL 1K
R63	1-215-401-11	METAL 150 1% 1/6W	RV8	1-228-888-00	METAL 1K
R64	1-215-445-00	METAL 10K 1% 1/6W	RV9	1-228-891-00	METAL 10K
R75	1-215-414-00	METAL 510 1% 1/6W	RV11	1-228-889-00	METAL 2.2K
R76	1-215-414-00	METAL 510 1% 1/6W	RV12	1-228-308-00	METAL 10K
R82	1-215-429-00	METAL 2.2K 1% 1/6W	RV13	1-228-308-00	METAL 10K
R83	1-215-453-00	METAL 22K 1% 1/6W	RV14	1-224-940-00	METAL 10K
R84	1-215-438-00	METAL 5.1K 1% 1/6W	RV15	1-228-892-00	METAL 22K (NTSC)
R86	1-215-437-00	METAL 4.7K 1% 1/6W	RV16	1-228-889-00	METAL 2.2K (NTSC)
R87	1-215-394-00	METAL 75 1% 1/6W	RV17	1-228-892-00	METAL 22K
R95	1-215-394-00	METAL 75 1% 1/6W	RV18	1-228-892-00	METAL 22K
R107	1-215-393-00	METAL 68 1% 1/6W	RV19	1-228-889-00	METAL 2.2K
R119	1-215-432-00	METAL 3K 1% 1/6W (NTSC)	RV20	1-228-892-00	METAL 22K
R119	1-215-434-00	METAL 3.6K 1% 1/6W (PAL)	RV21	1-228-892-00	METAL 22K
R122	1-215-421-00	METAL 1K 1% 1/6W	S1	1-554-076-00	SLIDE
R123	1-215-421-00	METAL 1K 1% 1/6W	S2	1-554-508-21	SLIDE
R127	1-215-457-00	METAL 33K 1% 1/6W (NTSC)	S3	1-554-508-00	SLIDE
R128	1-215-448-00	METAL 13K 1% 1/6W (NTSC)	S4	1-554-075-00	SLIDE
R129	1-215-445-00	METAL 10K 1% 1/6W (NTSC)	S5	1-554-508-21	SLIDE
R131	1-215-445-00	METAL 10K 1% 1/6W (NTSC)			
R145	1-215-457-00	METAL 33K 1% 1/6W			
R146	1-215-451-00	METAL 18K 1% 1/6W			
R156	1-215-414-00	METAL 510 1% 1/6W (NTSC)			
R156	1-215-422-00	METAL 1.1K 1% 1/6W (PAL)			
R157	1-215-414-00	METAL 510 1% 1/6W (NTSC)			
R157	1-215-422-00	METAL 1.1K 1% 1/6W (PAL)			
R159	1-215-429-00	METAL 2.2K 1% 1/6W			
R163	1-215-425-00	METAL 1.5K 1% 1/6W			
R164	1-215-425-00	METAL 1.5K 1% 1/6W			
R165	1-215-432-00	METAL 3K 1% 1/6W			



Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
IE-7 BOARD			C69	1-163-097-00	CERAMIC CHIP 15PF
( ) A-7511-939-A	MOUNTED CIRCUIT BOARD				5% 50V
	"IE-7" (NTSC)		C70	1-123-617-00	ELECT 10 20% 16V
( ) A-7511-940-A	MOUNTED CIRCUIT BOARD		C71	1-123-617-00	ELECT 10 20% 16V
	"IE-7" (PAL)		C74	1-123-617-00	ELECT 10 20% 16V
			C75	1-123-617-00	ELECT 10 20% 16V
C3	1-163-251-00	CERAMIC CHIP 100PF	C77	1-123-645-00	ELECT 33 20% 10V
		5% 50V	C78	1-123-645-00	ELECT 33 20% 10V
C5	1-163-222-00	CERAMIC CHIP 5PF	C81	1-163-239-00	CERAMIC CHIP 33PF
		±0.25PF 50V			5% 50V
C11	1-163-097-00	CERAMIC CHIP 15PF	C82	1-123-617-00	ELECT 10 20% 16V
		5% 50V	C83	1-163-255-00	CERAMIC CHIP 150PF
C24	1-163-251-00	CERAMIC CHIP 100PF			5% 50V
		5% 50V	C85	1-123-645-00	ELECT 33 20% 10V
C25	1-163-235-00	CERAMIC CHIP 22PF	C87	1-163-239-00	CERAMIC CHIP 33PF
		5% 50V			5% 50V
C26	1-123-647-00	ELECT 47 20% 6.3V	C88	1-163-247-00	CERAMIC CHIP 68PF
C27	1-163-251-00	CERAMIC CHIP 100PF			5% 50V
		5% 50V	C89	1-163-235-00	CERAMIC CHIP 22PF
C30	1-124-140-00	ELECT 220 20% 10V			5% 50V
C31	1-123-645-00	ELECT 33 20% 10V	C90	1-163-239-00	CERAMIC CHIP 33PF
C32	1-123-645-00	ELECT 33 20% 10V			5% 50V
C41	1-163-251-00	CERAMIC CHIP 100PF	C91	1-163-251-00	CERAMIC CHIP 100PF
		5% 50V			5% 50V
C44	1-163-235-00	CERAMIC CHIP 22PF	C94	1-123-647-00	ELECT 47 20% 6.3V
		5% 50V	C95	1-163-235-00	CERAMIC CHIP 22PF
C45	1-163-235-00	CERAMIC CHIP 22PF			5% 50V
		5% 50V	C99	1-163-247-00	CERAMIC CHIP 68PF
C46	1-163-251-00	CERAMIC CHIP 100PF			5% 50V
		5% 50V			
C47	1-123-645-00	ELECT 33 20% 10V	CN1	1-560-041-00	RECEPTACLE, 31P MALE
C48	1-163-243-00	CERAMIC CHIP 47PF			
		5% 50V	D1	8-719-100-05	1S2837
C53	1-163-224-00	CERAMIC CHIP 7PF	D2	8-719-100-05	1S2837
		±0.25PF 50V	D3	8-719-100-05	1S2837
C54	1-163-224-00	CERAMIC CHIP 7PF	D4	8-719-100-05	1S2837
		±0.25PF 50V			
C57	1-163-097-00	CERAMIC CHIP 15PF			
		5% 50V			
C58	1-163-097-00	CERAMIC CHIP 15PF	DL1	1-415-305-11	65.32uS (NTSC)
		5% 50V	DL1	1-415-305-21	65.32uS (PAL)
C59	1-163-097-00	CERAMIC CHIP 15PF	DL2	1-415-307-00	165nS
		5% 50V			
C61	1-163-224-00	CERAMIC CHIP 7PF			
		±0.25PF 50V			
C62	1-163-224-00	CERAMIC CHIP 7PF	IC1	8-759-000-05	MC1496G: MOTOROLA
		±0.25PF 50V	IC2	8-759-000-05	MC1496G: MOTOROLA
C66	1-163-239-00	CERAMIC CHIP 33PF	IC3	8-759-907-34	uA733HC: FSC
		5% 50V	IC4	8-759-400-05	AN6041: PANASONIC
C67	1-163-239-00	CERAMIC CHIP 33PF	IC5	8-759-729-03	NJM2903D: JRC
		5% 50V			

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
IC6	8-759-240-53	TC4053BP: TOSHIBA	Q31	8-729-175-73	2SC2757
IC7	8-759-990-62	TL062CP: TI	Q32	8-729-175-73	2SC2757
IC8	8-759-990-62	TL062CP: TI	Q33	8-729-175-73	2SC2757
IC9	8-758-150-00	CX815: SONY	Q34	8-729-100-66	2SC1623
IC10	8-759-940-98	CD4098BE: RCA	Q35	8-729-100-66	2SC1623
L3	1-408-147-00	MICRO 2.2	Q36	8-729-100-66	2SC1623
L4	1-408-146-00	MICRO 1	Q37	8-729-104-45	2SJ44
L12	1-408-147-00	MICRO 2.2	Q38	8-729-100-66	2SC1623
L13	1-408-147-00	MICRO 2.2	Q39	8-729-100-66	2SC1623
L14	1-408-147-00	MICRO 2.2	Q40	8-729-100-66	2SC1623
LV1	1-408-388-00	3.3	Q41	8-729-100-66	2SC1623
LV2	1-408-388-00	3.3	Q42	8-729-100-66	2SC1623
Q1	8-729-100-66	2SC1623	Q43	8-729-100-66	2SC1623
Q2	8-729-100-66	2SC1623	Q44	8-729-100-66	2SC1623
Q3	8-729-100-66	2SC1623	Q45	8-729-100-66	2SC1623
Q4	8-729-100-66	2SC1623	Q46	8-729-100-66	2SC1623
Q5	8-729-175-73	2SC2757	Q47	8-729-100-76	2SA812
Q6	8-729-175-73	2SC2757	Q48	8-729-100-66	2SC1623
Q7	8-729-175-73	2SC2757	R9	1-215-422-00	METAL 1.1K 1% 1/6W
Q8	8-729-800-43	2SK152-3	R10	1-215-412-00	METAL 430 1% 1/6W
Q9	8-729-100-76	2SA812	R16	1-215-422-00	METAL 1.1K 1% 1/6W
Q10	8-729-110-53	2SA1005	R17	1-215-412-00	METAL 430 1% 1/6W
Q11	8-729-100-66	2SC1623	R23	1-215-413-00	METAL 470 1% 1/6W
Q12	8-729-100-66	2SC1623	R32	1-215-390-00	METAL 51 1% 1/6W
Q13	8-729-100-66	2SC1623	R33	1-215-390-00	METAL 51 1% 1/6W
Q14	8-729-100-66	2SC1623	R34	1-215-385-00	METAL 33 1% 1/6W
Q15	8-729-175-73	2SC2757	R37	1-215-418-00	METAL 750 1% 1/6W
Q16	8-729-100-66	2SC1623	R39	1-215-418-00	METAL 750 1% 1/6W
Q17	8-729-100-76	2SA812	R41	1-215-437-00	METAL 4.7K 1% 1/6W
Q18	8-729-800-43	2SK152-3	R44	1-215-420-00	METAL 910 1% 1/6W
Q19	8-729-100-66	2SC1623	R46	1-215-462-00	METAL 51K 1% 1/6W
Q20	8-729-100-66	2SC1623	R49	1-215-413-00	METAL 470 1% 1/6W
Q21	8-729-110-53	2SA1005	R50	1-215-431-00	METAL 2.7K 1% 1/6W
Q22	8-729-100-76	2SA812	R51	1-215-426-00	METAL 1.6K 1% 1/6W
Q23	8-729-175-73	2SC2757	R52	1-215-413-00	METAL 470 1% 1/6W
Q24	8-729-175-73	2SC2757	R64	1-215-457-00	METAL 33K 1% 1/6W
Q25	8-729-175-73	2SC2757	R66	1-215-419-00	METAL 820 1% 1/6W
Q26	8-729-110-53	2SA1005	R67	1-215-463-00	METAL 56K 1% 1/6W
Q27	8-729-800-43	2SK152-3	R72	1-215-428-00	METAL 2K 1% 1/6W
Q28	8-729-175-73	2SC2757	R76	1-215-436-00	METAL 4.3K 1% 1/6W
Q29	8-729-800-43	2SK152-3	R77	1-215-418-00	METAL 750 1% 1/6W
Q30	8-729-175-73	2SC2757	R78	1-215-418-00	METAL 750 1% 1/6W
			R88	1-215-412-00	METAL 430 1% 1/6W

Ref.No.	Part No.	Description
R89	1-215-450-00	METAL 16K 1% 1/6W
R99	1-215-412-00	METAL 430 1% 1/6W
R100	1-215-412-00	METAL 430 1% 1/6W
R101	1-215-412-00	METAL 430 1% 1/6W
R102	1-215-412-00	METAL 430 1% 1/6W
R119	1-215-433-00	METAL 3.3K 1% 1/6W
R120	1-215-435-00	METAL 3.9K 1% 1/6W
R165	1-215-412-00	METAL 430 1% 1/6W

RV1	1-228-889-00	METAL 2.2K
RV2	1-228-890-00	METAL 4.7K
RV3	1-226-701-00	METAL 220
RV4	1-224-939-00	METAL 5K
RV5	1-228-306-00	METAL 2K
RV6	1-228-890-00	METAL 4.7K
RV7	1-228-308-00	METAL 10K

S1	1-553-977-00	SLIDE "SC 0" 180°
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X1	1-527-349-00	30MHz
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Ref.No.	Part No.	Description
PA-22 BOARD		
( )	A-7511-926-A	MOUNTED CIRCUIT BOARD "PA-22"

C5	1-102-947-00	CERAMIC 10PF 5% 50V
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CN1	1-564-266-00	RECEPTACLE, 4P MALE
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CV1	1-141-284-00	20.5PF
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L1	1-408-072-00	MICRO 47
L2	1-408-096-00	MICRO 470
L3	1-408-072-00	MICRO 47
L4	1-408-072-00	MICRO 47

Q1	8-729-384-48	2SA844
Q2	8-729-178-73	2SC2787
Q3	8-729-384-48	2SA844
Q4	8-729-178-73	2SC2787

R4	1-214-561-00	METAL 1.5K 1% 1/8W
R7	1-214-564-00	METAL 2K 1% 1/8W

RV1	1-228-469-00	METAL 200
RV2	1-228-473-00	METAL 5K

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
PR-61	BOARD		C36	1-123-822-00	ELECT 47 20% 10V
( ) A-7513-085-A	MOUNTED CIRCUIT BOARD	"PR-61" (NTSC)	C37	1-163-219-00	CERAMIC CHIP 2PF
( ) A-7513-086-A	MOUNTED CIRCUIT BOARD	"PR-61" (PAL)	C38	1-163-225-00	CERAMIC CHIP 8PF
			C40	1-123-617-00	ELECT 10 20% 16V
			C41	1-163-217-00	CERAMIC CHIP 1PF
					$\pm 0.25$ PF 50V
	1-560-041-00	RECEPTACLE, 31P MALE	C42	1-123-822-00	ELECT 47 20% 10V
			C43	1-123-307-00	ELECT 100 20% 10V
			C44	1-163-097-00	CERAMIC CHIP 15PF
					5% 50V
C3	1-163-141-00	CERAMIC CHIP 0.001	C45	1-163-237-00	CERAMIC CHIP 27PF
		10% 50V	C47	1-123-822-00	ELECT 47 20% 10V
C4	1-123-617-00	ELECT 10 20% 16V			
C6	1-123-617-00	ELECT 10 20% 16V	C48	1-123-617-00	ELECT 10 20% 16V
C7	1-123-822-00	ELECT 47 20% 10V	C51	1-163-222-00	CERAMIC CHIP 5PF
C8	1-123-822-00	ELECT 47 20% 10V			$\pm 0.25$ PF 50V
			C52	1-163-222-00	CERAMIC CHIP 5PF
C9	1-163-219-00	CERAMIC CHIP 2PF			$\pm 0.25$ PF 50V
		$\pm 0.25$ PF 50V	C53	1-163-227-00	CERAMIC CHIP 10PF
C10	1-163-225-00	CERAMIC CHIP 8PF			5% 50V
		$\pm 0.25$ PF 50V	C54	1-163-235-00	CERAMIC CHIP 22PF
C11	1-123-617-00	ELECT 10 20% 16V			5% 50V
C12	1-163-217-00	CERAMIC CHIP 1PF			
		$\pm 0.25$ PF 50V	C56	1-123-822-00	ELECT 47 20% 10V
C13	1-123-822-00	ELECT 47 20% 10V	C57	1-123-822-00	ELECT 47 20% 10V
C14	1-123-307-00	ELECT 100 20% 10V	C58	1-163-235-00	CERAMIC CHIP 22PF
C15	1-163-097-00	CERAMIC CHIP 15PF			5% 50V
		5% 50V	C61	1-163-141-00	CERAMIC CHIP 0.001
C16	1-163-237-00	CERAMIC CHIP 27PF			10% 50V
		5% 50V	C63	1-123-617-00	ELECT 10 20% 16V
C18	1-123-822-00	ELECT 47 20% 10V	C64	1-123-822-00	ELECT 47 20% 10V
C19	1-123-617-00	ELECT 10 20% 16V	C65	1-123-822-00	ELECT 47 20% 10V
			C66	1-163-219-00	CERAMIC CHIP 2PF
C22	1-163-222-00	CERAMIC CHIP 5PF			$\pm 0.25$ PF 50V
		$\pm 0.25$ PF 50V	C67	1-163-225-00	CERAMIC CHIP 8PF
C23	1-163-227-00	CERAMIC CHIP 10PF			$\pm 0.25$ PF 50V
		5% 50V	C68	1-163-217-00	CERAMIC CHIP 1PF
C24	1-163-222-00	CERAMIC CHIP 5PF			$\pm 0.25$ PF 50V
		$\pm 0.25$ PF 50V			
C25	1-163-235-00	CERAMIC CHIP 22PF	C69	1-123-822-00	ELECT 47 20% 10V
		5% 50V	C70	1-123-307-00	ELECT 100 20% 10V
C27	1-123-822-00	ELECT 47 20% 10V	C71	1-163-097-00	CERAMIC CHIP 15PF
					5% 50V
C28	1-123-822-00	ELECT 47 20% 10V	C72	1-163-237-00	CERAMIC CHIP 27PF
C29	1-163-235-00	CERAMIC CHIP 22PF			5% 50V
		5% 50V	C74	1-123-822-00	ELECT 47 20% 10V
C32	1-163-141-00	CERAMIC CHIP 0.001			10% 50V
		10% 50V			
C34	1-123-617-00	ELECT 10 20% 16V			
C35	1-123-822-00	ELECT 47 20% 16V			

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
C75	1-123-617-00	ELECT 10 20% 16V	D11	8-719-100-03	1S2835
C78	1-163-222-00	CERAMIC CHIP 5PF	D12	8-719-100-03	1S2835
		+0.25PF 50V	D13	8-719-100-03	1S2835
C79	1-163-222-00	CERAMIC CHIP 5PF	D14	8-719-100-03	1S2835
		+0.25PF 50V	D15	8-719-100-03	1S2835
C80	1-163-227-00	CERAMIC CHIP 10PF			
		5% 50V	D16	8-719-100-03	1S2835
C81	1-163-235-00	CERAMIC CHIP 22PF	D17	8-719-942-31	HZ3ALL
		5% 50V	D18	8-719-100-03	1S2835
C83	1-123-822-00	ELECT 47 20% 10V	D19	8-719-100-05	1S2837
C84	1-123-822-00	ELECT 47 20% 10V	D20	8-719-100-05	1S2837
C85	1-163-235-00	CERAMIC CHIP 22PF			
		5% 50V	IC1	8-759-990-62	TL062CP: TI
C86	1-123-822-00	ELECT 47 20% 10V	IC2	8-759-271-58	TA7158P: TOSHIBA
C87	1-163-247-00	CERAMIC CHIP 68PF	IC3	8-759-990-62	TL062CP: TI
		5% 50V	IC4	8-759-990-62	TL062CP: TI
C88	1-163-222-00	CERAMIC CHIP 5PF	IC5	8-759-271-58	TA7158P: TOSHIBA
		+0.25PF 50V			
C89	1-124-140-00	ELECT 220 20% 6.3V	IC6	8-759-990-62	TL062CP: TI
C90	1-123-617-00	ELECT 10 20% 16V	IC7	8-759-271-58	TA7158P: TOSHIBA
C91	1-123-617-00	ELECT 10 20% 16V	IC8	8-759-990-62	TL062CP: TI
C92	1-123-617-00	ELECT 10 20% 16V	IC9	8-759-200-05	TC40H008P: TOSHIBA
			IC10	8-759-200-17	TC40H027P: TOSHIBA
C95	1-163-227-00	CERAMIC CHIP 10PF			
		5% 50V	IC11	8-759-220-00	TC40H000P: TOSHIBA
C96	1-163-243-00	CERAMIC CHIP 47PF	IC12	8-759-221-93	TC40H193P: TOSHIBA
		5% 50V			
C97	1-163-239-00	CERAMIC CHIP 33PF			
		5% 50V	Q1	8-729-100-76	2SA812
C98	1-163-239-00	CERAMIC CHIP 33PF	Q2	8-729-109-44	2SK94
		5% 50V	Q3	8-729-109-44	2SK94
C99	1-163-239-00	CERAMIC CHIP 33PF	Q4	8-729-109-44	2SK94
		5% 50V	Q5	8-729-100-76	2SA812
C100	1-123-617-00	ELECT 10 20% 16V (NTSC)			
C100	1-163-243-00	CERAMIC CHIP 47PF	Q6	8-729-175-73	2SC2757
		5% 50V (PAL)	Q7	8-729-100-76	2SA812
C108	1-123-617-00	ELECT 10 20% 16V	Q8	8-729-109-44	2SK94
C110	1-163-243-00	CERAMIC CHIP 47PF	Q9	8-729-100-66	2SC1623
		5% 50V (NTSC)	Q10	8-729-100-66	2SC1623
			Q11	8-729-100-66	2SC1623
D1	8-719-100-03	1S2835	Q12	8-729-100-66	2SC1623
D2	8-719-100-03	1S2835	Q13	8-729-122-63	2SA1226
D3	8-719-100-03	1S2835	Q14	8-729-100-66	2SC1623
D4	8-719-100-03	1S2835	Q15	8-729-109-44	2SK94
D5	8-719-100-03	1S2835			
			Q16	8-729-100-76	2SA812
D6	8-719-100-03	1S2835	Q17	8-729-100-76	2SA812
D7	8-719-100-03	1S2835	Q18	8-729-100-66	2SC1623
D8	8-719-100-03	1S2835	Q19	8-729-100-66	2SC1623
D9	8-719-100-03	1S2835	Q20	8-729-100-76	2SA812
D10	8-719-100-03	1S2835			

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
Q21	8-729-100-76	2SA812	R3	1-215-424-00	ELECT 1.3K 1% 1/6W
Q22	8-729-109-44	2SK94	R11	1-215-409-00	METAL 330 1% 1/6W
Q23	8-729-109-44	2SK94	R12	1-215-438-00	METAL 5.1K 1% 1/6W
Q24	8-729-109-44	2SK94	R18	1-215-405-00	METAL 220 1% 1/6W
Q25	8-729-100-76	2SA812	R19	1-215-425-00	METAL 1.5K 1% 1/6W
Q26	8-729-175-73	2SC2757	R21	1-215-443-00	METAL 8.2K 1% 1/6W
Q27	8-729-100-76	2SA812	R22	1-215-427-00	METAL 1.8K 1% 1/6W
Q28	8-729-100-66	2SC1623	R31	1-215-435-00	METAL 3.9K 1% 1/6W
Q29	8-729-100-66	2SC1623	R33	1-215-435-00	METAL 3.9K 1% 1/6W
Q30	8-729-100-66	2SC1623	R34	1-215-413-00	METAL 470 1% 1/6W
Q31	8-729-100-66	2SC1623	R37	1-215-420-00	METAL 910 1% 1/6W
Q32	8-729-122-63	2SA1226	R38	1-215-435-00	METAL 3.9K 1% 1/6W
Q33	8-729-100-66	2SC1623	R39	1-215-420-00	METAL 910 1% 1/6W
Q34	8-729-109-44	2SK94	R40	1-215-413-00	METAL 470 1% 1/6W
Q35	8-729-100-76	2SA812	R54	1-215-435-00	METAL 3.9K 1% 1/6W
Q36	8-729-100-76	2SA812	R55	1-215-443-00	METAL 8.2K 1% 1/6W
Q37	8-729-100-66	2SC1623	R56	1-215-445-00	METAL 10K 1% 1/6W
Q38	8-729-100-66	2SC1623	R57	1-215-445-00	METAL 10K 1% 1/6W
Q39	8-729-100-76	2SA812	R59	1-215-423-00	METAL 1.2K 1% 1/6W
Q40	8-729-100-76	2SA812	R60	1-215-425-00	METAL 1.5K 1% 1/6W
Q41	8-729-109-44	2SK94	R61	1-215-397-00	METAL 100 1% 1/6W
Q42	8-729-109-44	2SK94	R63	1-215-429-00	METAL 2.2K 1% 1/6W
Q43	8-729-109-44	2SK94	R65	1-215-419-00	METAL 820 1% 1/6W
Q44	8-729-100-76	2SA812	R66	1-215-445-00	METAL 10K 1% 1/6W
Q45	8-729-175-73	2SC2757	R67	1-215-421-00	METAL 1K 1% 1/6W
Q46	8-729-100-76	2SA812	R81	1-215-414-00	METAL 510 1% 1/6W
Q47	8-729-100-66	2SC1623	R88	1-215-409-00	METAL 820 1% 1/6W
Q48	8-729-100-66	2SC1623	R89	1-215-438-00	METAL 5.1K 1% 1/6W
Q49	8-729-100-66	2SC1623	R94	1-215-405-00	METAL 220 1% 1/6W
Q50	8-729-100-66	2SC1623	R95	1-215-425-00	METAL 1.5K 1% 1/6W
Q51	8-729-122-63	2SA1226	R97	1-215-443-00	METAL 8.2K 1% 1/6W
Q52	8-729-100-66	2SC1623	R98	1-215-427-00	METAL 1.8K 1% 1/6W
Q53	8-729-109-44	2SK94	R107	1-215-435-00	METAL 3.9K 1% 1/6W
Q54	8-729-100-76	2SA812	R109	1-215-435-00	METAL 3.9K 1% 1/6W
Q55	8-729-100-76	2SA812	R110	1-215-413-00	METAL 470 1% 1/6W
Q56	8-729-100-66	2SC1623	R111	1-215-449-00	METAL 15K 1% 1/6W
Q57	8-729-100-66	2SC1623	R114	1-215-420-00	METAL 910 1% 1/6W
Q58	8-729-100-76	2SA812	R115	1-215-435-00	METAL 3.9K 1% 1/6W
Q59	8-729-100-76	2SA812	R116	1-215-420-00	METAL 910 1% 1/6W
Q60	8-729-100-76	2SA812	R117	1-215-413-00	METAL 470 1% 1/6W
Q61	8-729-100-76	2SA812	R130	1-215-449-00	METAL 15K 1% 1/6W
Q62	8-729-100-76	2SA812	R132	1-215-435-00	METAL 3.9K 1% 1/6W
Q63	8-729-100-66	2SC1623	R133	1-215-443-00	METAL 8.2K 1% 1/6W
Q64	8-729-100-76	2SA812	R134	1-215-445-00	METAL 10K 1% 1/6W
Q65	8-729-100-76	2SA812	R135	1-215-455-00	METAL 27K 1% 1/6W
Q66	8-729-100-76	2SA812			

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
R137	1-215-423-00	METAL 1.2K 1% 1/6W	RV1	1-228-888-00	METAL 1K
R138	1-215-425-00	METAL 1.5K 1% 1/6W	RV2	1-228-894-00	METAL 47K
R139	1-215-397-00	METAL 100 1% 1/6W	RV3	1-228-887-00	METAL 470
R141	1-215-429-00	METAL 2.2K 1% 1/6W	RV4	1-228-890-00	METAL 4.7K
R143	1-215-419-00	METAL 820 1% 1/6W	RV5	1-228-888-00	METAL 1K
R144	1-215-445-00	METAL 10K 1% 1/6W	RV6	1-228-894-00	METAL 47K
R145	1-215-421-00	METAL 1K 1% 1/6W	RV7	1-228-894-00	METAL 47K
R159	1-215-417-00	METAL 680 1% 1/6W	RV8	1-228-887-00	METAL 470
R166	1-215-409-00	METAL 820 1% 1/6W	RV9	1-228-890-00	METAL 4.7K
R167	1-215-438-00	METAL 5.1K 1% 1/6W	RV11	1-228-888-00	METAL 1K
R172	1-215-405-00	METAL 220 1% 1/6W	RV12	1-228-894-00	METAL 47K
R173	1-215-425-00	METAL 1.5K 1% 1/6W	RV13	1-228-894-00	METAL 47K
R175	1-215-443-00	METAL 8.2K 1% 1/6W	RV14	1-228-887-00	METAL 470
R176	1-215-427-00	METAL 1.8K 1% 1/6W	RV15	1-228-890-00	METAL 4.7K
R185	1-215-435-00	METAL 3.9K 1% 1/6W	RV17	1-228-889-00	METAL 2.2K
R187	1-215-435-00	METAL 3.9K 1% 1/6W	RV18	1-228-889-00	METAL 2.2K
R188	1-215-413-00	METAL 470 1% 1/6W	RV19	1-228-889-00	METAL 2.2K
R189	1-215-449-00	METAL 15K 1% 1/6W	RV20	1-228-891-00	METAL 10K
R192	1-215-420-00	METAL 910 1% 1/6W	RV21	1-228-888-00	METAL 1K
R193	1-215-435-00	METAL 3.9K 1% 1/6W	RV22	1-228-894-00	METAL 47K
R194	1-215-420-00	METAL 910 1% 1/6W			
R195	1-215-413-00	METAL 470 1% 1/6W			
R208	1-215-449-00	METAL 15K 1% 1/6W			
R210	1-215-435-00	METAL 3.9K 1% 1/6W			
R211	1-215-443-00	METAL 8.2K 1% 1/6W			
R212	1-215-445-00	METAL 10K 1% 1/6W			
R213	1-215-455-00	METAL 27K 1% 1/6W			
R215	1-215-423-00	METAL 1.2K 1% 1/6W			
R216	1-215-425-00	METAL 1.5K 1% 1/6W			
R217	1-215-397-00	METAL 100 1% 1/6W			
R219	1-215-429-00	METAL 2.2K 1% 1/6W			
R221	1-215-419-00	METAL 820 1% 1/6W			
R222	1-215-445-00	METAL 10K 1% 1/6W			
R223	1-215-421-00	METAL 1K 1% 1/6W			
R259	1-215-445-00	METAL 10K 1% 1/6W			
R260	1-215-456-00	METAL 30K 1% 1/6W			
R261	1-215-445-00	METAL 10K 1% 1/6W			
R262	1-215-456-00	METAL 30k 1% 1/6W			
R263	1-215-445-00	METAL 10K 1% 1/6W			
R264	1-215-456-00	METAL 30k 1% 1/6W			
R265	1-215-435-00	METAL 3.9K 1% 1/6W			
R266	1-215-455-00	METAL 27K 1% 1/6W			
R267	1-215-435-00	METAL 3.9K 1% 1/6W			
R268	1-215-455-00	METAL 27K 1% 1/6W			
R269	1-215-435-00	METAL 3.9K 1% 1/6W			
R270	1-215-455-00	METAL 27K 1% 1/6W			

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
PS-15 BOARD			C54	1-130-471-00	MYLAR 0.001 5% 50V
()	A-7511-930-A	MOUNTED CIRCUIT BOARD "PS-15"	C56	1-102-947-00	CERAMIC 10PF 5% 50V
			C57	1-102-944-00	CERAMIC 7PF $\pm 0.5$ PF 50V
			C58	1-123-382-00	ELECT 3.3 20% 100V
			C59	1-123-620-00	ELECT 10 20% 25V
			C60	1-123-620-00	ELECT 10 20% 25V
C1	1-123-336-00	ELECT 470 20% 25V	C61	1-123-620-00	ELECT 10 20% 25V
C2	1-130-489-00	MYLAR 0.033 5% 50V	C63	1-123-612-00	ELECT 2.2 20% 50V
C3	1-131-466-00	TANTALUM 150 20% 16V	C64	1-130-471-00	MYLAR 0.001 5% 50V
C4	1-130-485-00	MYLAR 0.015 5% 50V	C65	1-124-147-00	ELECT 47 20% 25V
C5	1-130-475-00	MYLAR 0.0022 5% 50V			
C7	1-123-323-00	ELECT 470 20% 16V	C66	1-130-471-00	MYLAR 0.001 5% 50V
C8	1-102-106-00	CERAMIC 100PF 10% 50V	C68	1-124-147-00	ELECT 47 20% 25V
C9	1-123-612-00	ELECT 2.2 20% 50V	C69	1-123-819-00	ELECT 33 20% 25V
C11	1-123-323-00	ELECT 470 20% 16V	C70	1-123-607-00	ELECT 0.1 20% 50V
C15	1-123-617-00	ELECT 10 20% 16V	C71	1-123-607-00	ELECT 0.1 20% 50V
			C72	1-123-607-00	ELECT 0.1 20% 50V
C16	1-123-617-00	ELECT 10 20% 16V	C73	1-124-143-00	ELECT 100 20% 16V
C17	1-123-620-00	ELECT 10 20% 25V	C74	1-102-944-00	CERAMIC 7PF $\pm 0.5$ PF 50V
C18	1-124-148-00	ELECT 100 20% 25V	C75	1-130-471-00	MYLAR 0.001 5% 50V
C19	1-124-148-00	ELECT 100 20% 25V	C77	1-123-819-00	ELECT 33 20% 25V
C21	1-131-466-00	TANTALUM 150 20% 16V			
C22	1-124-139-00	ELECT 100 20% 10V	C78	1-102-947-00	CERAMIC 10PF 10% 50V
C23	1-123-816-00	ELECT 10 20% 50V	C79	1-102-944-00	CERAMIC 7PF $\pm 0.5$ PF 50V
C24	1-124-453-00	ELECT 10 20% 200V	C80	1-130-471-00	MYLAR 0.001 5% 50V
C26	1-131-466-00	TANTALUM 150 20% 16V	C81	1-123-617-00	ELECT 10 20% 16V
C27	1-123-382-00	ELECT 3.3 20% 100V	C82	1-130-467-00	MYLAR 470PF 5% 50V
C30	1-123-622-00	ELECT 22 20% 16V	C83	1-102-106-00	CERAMIC 100PF 10% 50V
C31	1-123-622-00	ELECT 22 20% 16V	C84	1-102-106-00	CERAMIC 100PF 10% 50V
C33	1-124-147-00	ELECT 47 20% 25V	C85	1-102-106-00	CERAMIC 100PF 10% 50V
C34	1-123-816-00	ELECT 10 20% 50V			
C35	1-123-617-00	ELECT 10 20% 16V	CN1	1-560-041-00	RECEPTACLE, 31P MALE
C36	1-124-139-00	ELECT 100 20% 10V			
C38	1-123-647-00	ELECT 47 20% 6.3V	D1	8-719-982-04	ERB81-004
C39	1-123-929-00	ELECT 1 20% 160V	D3	8-719-102-51	1S251
C40	1-123-382-00	ELECT 3.3 20% 100V	D4	8-719-815-55	1S1555
C41	1-123-620-00	ELECT 10 20% 25V	D6	8-719-815-55	1S1555
C42	1-123-620-00	ELECT 10 20% 25V	D7	8-719-981-01	ERA81-004
C44	1-123-616-00	ELECT 4.7 20% 25V			
C45	1-123-612-00	ELECT 2.2 20% 50V	D8	8-719-981-01	ERA81-004
C46	1-130-471-00	MYLAR 0.001 5% 50V	D9	8-719-981-01	ERA81-004
C47	1-124-147-00	ELECT 47 20% 25V	D10	8-719-924-06	ERC24-06S
			D11	8-719-815-85	1S1585
C48	1-123-819-00	ELECT 33 20% 25V	D12	8-719-924-06	ERC24-06S
C49	1-102-947-00	CERAMIC 10PF 5% 50V			
C50	1-123-382-00	ELECT 3.3 20% 100V	D13	8-719-981-01	ERA81-004
C51	1-123-620-00	ELECT 10 20% 25V	D14	8-719-981-01	ERA81-004
C53	1-123-612-00	ELECT 2.2 20% 50V	D15	8-719-981-01	ERA81-004
			D16	8-719-981-01	ERA81-004
			D17	8-719-924-06	ERC24-06S



Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
D18	8-719-924-06	ERC24-06S	Q7	8-729-117-54	2SA1175
D19	8-719-924-06	ERC24-06S	Q8	8-729-177-43	2SD774
D20	8-719-924-06	ERC24-06S	Q9	8-729-177-43	2SD774
D22	8-719-981-01	ERA81-004	Q10	8-729-378-84	2SD788
D23	8-719-981-01	ERA81-004	Q11	8-729-612-77	2SA1027R
D24	8-719-981-01	ERA81-004	Q13	8-729-178-54	2SC2785
D25	8-719-981-01	ERA81-004	Q14	8-729-117-54	2SA1175
D26	8-719-815-85	1S1585	Q15	8-729-178-54	2SC2785
D27	8-719-815-85	1S1585	Q16	8-729-178-54	2SC2785
D28	8-719-981-01	ERA81-004	Q17	8-729-178-54	2SC2785
D29	8-719-981-01	ERA81-004	Q18	8-729-178-54	2SC2785
D30	8-719-815-55	1S1555	Q20	8-729-178-54	2SC2785
D34	8-719-815-55	1S1555	Q22	8-729-117-54	2SA1175
D38	8-719-815-55	1S1555	Q23	8-729-178-54	2SC2785
D40	8-719-815-55	1S1555	Q24	8-729-178-54	2SC2785
D44	8-719-815-55	1S1555	Q25	8-729-117-54	2SA1175
D45	8-719-815-55	1S1555	Q26	8-729-117-54	2SA1175
D46	8-719-815-55	1S1555	Q27	8-729-178-54	2SC2785
D47	8-719-815-55	1S1555	Q28	8-729-178-54	2SC2785
D48	8-719-815-55	1S1555	Q29	8-729-178-54	2SC2785
D49	8-719-815-55	1S1555	Q30	8-729-178-54	2SC2785
D50	8-719-815-55	1S1555	Q31	8-729-178-54	2SC2785
D51	8-719-815-55	1S1555	Q32	8-729-178-54	2SC2785
D52	8-719-815-55	1S1555	Q33	8-729-117-54	2SA1175
D53	8-719-815-55	1S1555	Q34	8-729-178-54	2SC2785
D54	8-719-815-55	1S1555	Q35	8-729-117-54	2SA1175
D55	8-719-815-55	1S1555	Q37	8-729-178-54	2SC2785
D56	8-719-815-55	1S1555	Q38	8-729-178-54	2SC2785
D57	8-719-815-55	1S1555	Q39	8-729-117-54	2SA1175
D65	8-719-815-55	1S1555	Q40	8-729-117-54	2SA1175
IC1	8-759-904-94	TL064CN: TI	Q41	8-729-178-54	2SC2785
IC2	8-759-900-64	TL064CN: TI	Q42	8-729-178-54	2SC2785
L1	1-408-144-00	206	Q43	8-729-178-54	2SC2785
L2	1-421-013-00	HORIZONTAL CHOKE 25	Q44	8-729-178-54	2SC2785
L4	1-421-013-00	HORIZONTAL CHOKE 25	Q45	8-729-178-54	2SC2785
L7	1-408-932-00	MICRO 100	Q46	8-729-178-54	2SC2785
Q1	8-729-603-50	2SC403SP	Q47	8-729-178-54	2SC2785
Q2	8-729-612-77	2SA1027R	Q51	8-729-378-84	2SD788
Q3	8-729-882-52	2SB825R	Q52	8-729-117-54	2SA1175
Q4	8-729-113-33	2SB733-4	Q53	8-729-178-54	2SC2785
Q5	8-729-603-50	2SC403SP	Q55	8-729-117-54	2SA1175
			Q56	8-729-117-54	2SA1175
			Q57	8-729-178-54	2SC2785
			Q58	8-729-117-54	2SA1175
			Q61	8-729-178-54	2SC2785

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
Q62	8-729-178-54	2SC2785	RV1	1-228-889-00	METAL 2.2K
Q63	8-729-178-54	2SC2785	RV2	1-228-889-00	METAL 2.2K
Q64	8-729-117-54	2SA1175	RV6	1-228-889-00	METAL 2.2K
Q65	8-729-163-93	2SA639S	RV7	1-228-888-00	METAL 1K
Q66	8-729-117-54	2SA1175	RV8	1-228-889-00	METAL 2.2K
			RV9	1-228-888-00	METAL 1K
R2	1-247-232-00	CARBON 470 5% 1/2W	RV10	1-228-891-00	METAL 10K
R3	1-215-445-00	METAL 10K 1% 1/6W	RV11	1-228-891-00	METAL 10K
R4	1-215-445-00	METAL 10K 1% 1/6W	RV12	1-228-895-00	METAL 100K
R9	1-215-439-00	METAL 5.6K 1% 1/6W	RV13	1-228-462-00	METAL 100K
R10	1-215-448-00	METAL 13K 1% 1/6W	RV14	1-228-889-00	METAL 2.2K
R14	1-215-443-00	METAL 8.2K 1% 1/6W	RV15	1-228-891-00	METAL 10K
R15	1-215-452-00	METAL 20K 1% 1/6W	RV16	1-228-891-00	METAL 10K
R23	1-215-454-00	METAL 24K 1% 1/6W	RV17	1-228-895-00	METAL 100K
R35	1-215-443-00	METAL 8.2K 1% 1/6W	RV18	1-228-462-00	METAL 100K
R36	1-215-444-00	METAL 9.1K 1% 1/6W	RV19	1-228-889-00	METAL 2.2K
R37	1-215-445-00	METAL 10K 1% 1/6W	RV20	1-228-891-00	METAL 10K
R38	1-215-445-00	METAL 10K 1% 1/6W	RV21	1-228-891-00	METAL 10K
R45	1-215-449-00	METAL 15K 1% 1/6W	RV22	1-228-895-00	METAL 100K
R49	1-215-456-00	METAL 30K 1% 1/6W	RV23	1-228-462-00	METAL 100K
R56	1-215-438-00	METAL 5.1K 1% 1/6W	RV24	1-228-888-00	METAL 1K
R57	1-215-445-00	METAL 10K 1% 1/6W			
R61	1-215-438-00	METAL 5.1K 1% 1/6W	T1	1-447-572-00	DC-DC CONVERTER
R66	1-215-449-00	METAL 15K 1% 1/6W			
R70	1-215-450-00	METAL 30K 1% 1/6W			
R74	1-215-456-00	METAL 30K 1% 1/6W			
R76	1-215-438-00	METAL 5.1K 1% 1/6W			
R78	1-215-438-00	METAL 5.1K 1% 1/6W			
R79	1-215-445-00	METAL 10K 1% 1/6W			
R85	1-215-445-00	METAL 10K 1% 1/6W			
R89	1-215-449-00	METAL 15K 1% 1/6W			
R93	1-215-456-00	METAL 30K 1% 1/6W			
R98	1-215-454-00	METAL 24K 1% 1/6W			
R99	1-215-438-00	METAL 5.1K 1% 1/6W			
R100	1-215-438-00	METAL 5.1K 1% 1/6W			
R101	1-215-445-00	METAL 10K 1% 1/6W			
R103	1-215-456-00	METAL 30K 1% 1/6W			
R106	1-215-445-00	METAL 10K 1% 1/6W			
R108	1-215-445-00	METAL 10K 1% 1/6W			
R115	1-215-456-00	METAL 30K 1% 1/6W			
R137	1-215-454-00	METAL 24K 1% 1/6W			
R157	1-215-421-00	METAL 1K 1% 1/6W			
R158	1-215-421-00	METAL 1K 1% 1/6W			
R159	1-215-421-00	METAL 1K 1% 1/6W			
R160	1-215-445-00	METAL 10K 1% 1/6W			
R161	1-215-445-00	METAL 10K 1% 1/6W			
R162	1-215-445-00	METAL 10K 1% 1/6W			

Ref No.	Part No.	Description	Ref.No.	Part No.	Description
PS-26	BOARD		R6	1-215-380-00	METAL 20 1% 1/6W
( )	1-610-094-00	PRINTED CIRCUIT BOARD "PS-26"	R7	1-215-380-00	METAL 20 1% 1/6W
			R9	1-215-457-00	METAL 33K 1% 1/6W
			R10	1-215-424-00	METAL 1.3K 1% 1/6W
C3	1-123-617-00	ELECT 10 20% 16V	RV1	1-224-937-00	METAL 1K
C4	1-123-818-00	ELECT 22 20% 25V	RV2	1-224-937-00	METAL 1K
C5	1-123-617-00	ELECT 10 20% 16V	RV3	1-224-937-00	METAL 1K
C6	1-130-483-00	MYLAR 0.01 5% 50V			
C7	1-124-341-00	ELECT 1 20% 200V			
			TH1	1-548-119-21	CLOCK
CN101	( ) 1-564-011-11	RECEPTACLE, 12P MALE			
	( ) 1-562-157-00	PLUG HOUSING 12P			
	( ) 1-564-026-00	PLUG CONTACT			
CN102	( ) 1-564-005-00	RECEPTACLE, 6P MALE			
	( ) 1-562-151-00	PLUG HOUSING 6P			
	( ) 1-564-026-00	PLUG CONTACT			
CN103	( ) 1-564-005-00	RECEPTACLE, 6P MALE			
	( ) 1-562-151-00	PLUG HOUSING 6P			
	( ) 1-564-026-00	PLUG CONTACT			
CN104	( ) 1-564-005-00	RECEPTACLE, 6P MALE			
	( ) 1-562-151-00	PLUG HOUSING 6P			
	( ) 1-564-026-00	PLUG CONTACT			
CN105	( ) 1-564-001-11	RECEPTACLE, 2P MALE			
	( ) 1-562-147-00	PLUG HOUSING 2P			
	( ) 1-564-026-00	PLUG CONTACT			
CN106	( ) 1-564-001-11	RECEPTACLE, 2P MALE			
	( ) 1-562-147-00	PLUG HOUSING 2P			
	( ) 1-564-026-00	PLUG CONTACT			
CN107	( ) 1-564-001-11	RECEPTACLE, 2P MALE			
	( ) 1-562-147-00	PLUG HOUSING 2P			
	( ) 1-564-026-00	PLUG CONTACT			
D1	8-719-151-07	RD5.1EB			
IC1	8-759-900-64	TL064CN: TI			
Q1	8-729-882-52	2SB825R			
R1	1-215-504-00	METAL 0.68 1% 1/4W			
R2	1-215-504-00	METAL 0.68 1% 1/4W			
R3	1-215-504-00	METAL 0.68 1% 1/4W			
R4	1-215-504-00	METAL 0.68 1% 1/4W			
R5	1-215-505-00	METAL 3.3 1% 1/4W			

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
SG-1A BOARD			D1	8-719-915-20	FC52M (NTSC)
	( ) A-7513-097-A	MOUNTED CIRCUIT BOARD "SG-1A" (NTSC)	D2	8-719-100-03	1S2835
	( ) A-7513-098-A	MOUNTED CIRCUIT BOARD "SG-1A" (PAL)	D3	8-719-915-20	FC52M (PAL)
C1	1-102-246-00	CERAMIC 47PF 10% 150V	IC1	8-741-104-00	BX1040: SONY
C2	1-102-246-00	CERAMIC 47PF 10% 150V	IC2	8-759-101-12	uPC311G2: NEC
C3	1-102-242-00	CERAMIC 3PF $\pm 0.5$ PF 50V	IC3	8-759-908-39	CX7998: SONY
C4	1-102-246-00	CERAMIC 47PF 10% 150V	IC4	8-741-129-10	EX1291: SONY
C5	1-102-246-00	CERAMIC 47PF 10% 150V	IC5	8-757-930-02	CX7930-1: SONY
C6	1-102-246-00	CERAMIC 47PF 10% 150V	IC6	8-759-907-81	SN74LS221NS: TI
C7	1-102-246-00	CERAMIC 47PF 10% 150V	IC8	8-741-129-20	EX1292: SONY (NTSC)
C8	1-102-246-00	CERAMIC 47PF 10% 150V	IC8	8-741-129-30	EX1293: SONY (PAL)
C9	1-102-246-00	CERAMIC 47PF 10% 150V	IC10	8-759-201-60	TC40H002F: TOSHIBA
C10	1-102-246-00	CERAMIC 47PF 10% 150V			
C11	1-102-246-00	CERAMIC 47PF 10% 150V	L1	1-408-417-00	MICRO 47
C12	1-102-242-00	CERAMIC 3PF $\pm 0.5$ PF 50V	L2	1-408-417-00	MICRO 47
C13	1-102-246-00	CERAMIC 47PF 10% 150V	L3	1-408-150-00	MICRO 22
C14	1-102-246-00	CERAMIC 47PF 10% 150V	L4	1-408-150-00	MICRO 22
C15	1-102-246-00	CERAMIC 47PF 10% 150V	L5	1-408-417-00	MICRO 47
C18	1-163-235-00	CERAMIC CHIP 22PF 5% 50V	L6	1-408-417-00	MICRO 47
C19	1-107-084-00	MICA 91PF 5% 50V (NTSC)	L7	1-408-417-00	MICRO 47
C19	1-107-080-00	MICA 62PF 5% 50V (PAL)	L8	1-408-417-00	MICRO 47
C20	1-107-084-00	MICA 91PF 5% 50V (NTSC)	L9	1-408-417-00	MICRO 47
C20	1-107-080-00	MICA 62PF 5% 50V (PAL)	Q1	8-729-100-66	2SC1623
C21	1-163-251-00	CERAMIC CHIP 100PF 5% 50V	Q2	8-729-109-94	2SK94
C27	1-163-141-00	CERAMIC CHIP 0.001 10% 50V (NTSC)	Q4	8-729-109-94	2SK94
C28	1-163-097-00	CERAMIC CHIP 15PF 5% 50V (NTSC)	Q5	8-729-100-66	2SC1623
C30	1-163-235-00	CERAMIC CHIP 22PF 5% 50V (NTSC)	Q6	8-729-100-76	2SA812
C31	1-163-141-00	CERAMIC CHIP 0.001 10% 50V (PAL)	Q7	8-729-100-76	2SA812
C32	1-163-097-00	CERAMIC CHIP 15PF 5% 50V (PAL)	Q8	8-729-100-66	2SC1623
C33	1-163-235-00	CERAMIC CHIP 22PF 5% 50V (PAL)	R32	1-215-445-00	METAL 10K 1% 1/6W
C47	1-130-471-00	MYLAR 0.001 5% 50V	R33	1-215-446-00	METAL 11K 1% 1/6W
			R35	1-215-448-00	METAL 13K 1% 1/6W
			RV1	1-228-890-00	METAL 4.7K
			S1	1-554-165-00	SLIDE

Ref.No.	Part No.	Description
VC01	1-527-478-00	14.31818MHz (NTSC)
VC01	1-527-585-00	17.734475MHz (PAL)

X1	1-567-298-11	14.31818MHz (NTSC)
X2	1-567-299-11	14.1875MHz (PAL)

Ref.No.	Part No.	Description
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SW-58 BOARD

( ) 1-612-833-11 PRINTED CIRCUIT BOARD  
"SW-58"

S1	1-554-165-00	SLIDE
S2	1-553-739-00	KEY BOARD
S3	1-554-165-00	SLIDE

Ref.No. Part No. Description

## SW-70 BOARD

( ) 1-612-842-11 PRINTED CIRCUIT BOARD  
"SW-70"

CN1 ( ) 1-564-013-00 RECEPTACLE, 3P MALE  
( ) 1-562-148-11 PLUG HOUSING 3P  
( ) 1-564-026-00 PLUG CONTACT

S1 1-553-739-00 KEY BOARD  
S2 1-553-739-00 KEY BOARD

Ref No. Part No. Description

## SW-99 BOARD

( ) 1-610-097-00 PRINTED CIRCUIT BOARD  
"SW-99"

S1 1-554-507-00 TOGGLE "PRE HEAT"  
S2 1-554-506-00 TOGGLE "GAIN"  
S3 1-554-506-00 TOGGLE "BARS/WB"  
S4 1-554-505-00 TOGGLE "DISP CHG"

Ref.No.	Part No.	Description
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## FRAME

## -MAIN FRAME-

( )	1-934-096-00	8P PLUG WITH HARNESS
( )	8-701-023-38	PICKUP TUBE CT-2332A

CN004	1-561-320-00	RECEPTACLE, 8P MALE "VF OUT"
CN005	1-562-221-21	RECEPTACLE, 12P MALE "LENS"

S1	1-553-430-00	TOGGLE "W/B BAL"
S2	1-554-486-00	TOGGLE "CONT MEMO"

Ref.No.	Part No.	Description
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## CN-97 BOARD

( )	A-7513-082-A	MOUNTED CIRCUIT BOARD "CN-97" (NTSC)
( )	A-7513-083-A	MOUNTED CIRCUIT BOARD "CN-97" (PAL)

C1	1-124-148-00	ELECT 100 20% 25V
C2	1-124-143-00	ELECT 100 20% 16V
C3	1-123-617-00	ELECT 10 20% 16V
C4	1-130-479-00	MYLAR 0.0047 5% 50V
C5	1-130-481-00	MYLAR 0.0068 5% 50V
C6	1-123-822-00	ELECT 47 20% 10V
C7	1-124-148-00	ELECT 100 20% 25V
C8	1-123-617-00	ELECT 10 20% 16V

CN300	( )	1-564-012-00	RECEPTACLE, 2P MALE
	( )	1-562-147-00	PLUG HOUSING 2P
	( )	1-564-026-00	PLUG CONTACT
CN310		1-560-043-00	RECEPTACLE, 31P FEMALE
CN320		1-560-043-00	RECEPTACLE, 31P FEMALE
CN330		1-560-043-00	RECEPTACLE, 31P FEMALE
CN340		1-560-043-00	RECEPTACLE, 31P FEMALE
CN350		1-560-043-00	RECEPTACLE, 31P FEMALE
CN360	( )	1-564-018-00	RECEPTACLE, 8P MALE
	( )	1-562-153-00	PLUG HOUSING 8P
	( )	1-564-026-00	PLUG CONTACT
CN370	( )	1-564-016-00	RECEPTACLE, 6P MALE
	( )	1-562-151-00	PLUG HOUSING 6P
	( )	1-564-026-00	PLUG CONTACT
CN380	( )	1-564-012-00	RECEPTACLE, 2P MALE
	( )	1-562-147-00	PLUG HOUSING 2P
	( )	1-564-026-00	PLUG CONTACT
CN390	( )	1-564-012-00	RECEPTACLE, 2P MALE
	( )	1-562-147-00	PLUG HOUSING 2P
	( )	1-564-026-00	PLUG CONTACT
CN401		1-564-267-00	RECEPTACLE, 36P MALE

D1	8-719-156-07	RD5.6EB
D2	8-719-121-35	1S2135
D3	8-719-121-35	1S2135
D4	8-719-100-52	5P2M
D5	8-719-815-55	1S1555
D6	8-719-815-55	1S1555
D7	8-719-815-55	1S1555
D8	8-719-815-55	1S1555
D9	8-719-815-55	1S1555
D10	8-719-815-55	1S1555
D11	8-719-981-01	ERA81-004

Ref.No.	Part No.	Description
A F1	1-532-557-00	3.15A NORMAL (NTSC)
	1-533-131-00	HOLDER, FUSE
A F1	1-532-237-00	3.15A TIME LAG (PAL)
	1-533-131-00	HOLDER, FUSE
IC1	8-759-101-21	uPC3423C: NEC
IC2	8-759-906-07	TL607CP: TI
IC3	8-759-045-38	MC14538BCP: MOTOROLA
IC4	8-759-240-40	TC4040BP: TOSHIBA
		(NTSC)
L1	1-408-462-11	MICRO 470
L2	1-408-462-11	MICRO 470
Q1	8-729-117-54	2SA1175
Q2	8-729-178-54	2SC2785
Q3	8-769-194-00	2SK43-4
Q4	8-729-102-03	2SD1020
Q5	8-729-181-13	2SB811
Q6	8-729-178-54	2SC2785
Q7	8-729-178-54	2SC2785
Q8	8-729-117-54	2SA1175
Q9	8-729-117-54	2SA1175
Q10	8-729-117-54	2SA1175
Q11	8-729-117-54	2SA1175
Q12	8-729-117-54	2SA1175
Q13	8-729-178-54	2SC2785
Q14	8-729-178-54	2SC2785
R6	1-246-437-00	CARBON 33 5% 1/4W
R7	1-246-437-00	CARBON 33 5% 1/4W
RV1	1-226-278-00	METAL 20
S1	1-554-981-11	PUSH

Ref.No.	Part No.	Description
-INTERFACE FRAME-		
CN901	1-561-781-21	RECEPTACLE BNC
		"VIDEO OUT"
CN902	1-561-781-21	RECEPTACLE BNC
		"GENLOCK"
CN903	1-507-251-XX	JACK "EAR PHONE"
CN904	1-562-244-00	RECEPTACLE, 26P MALE
		"VTR/CCU"
CN905	1-564-603-11	CONNECTOR(WITH SWITCH)
		4P "DC IN"
CN906	1-509-184-31	RECEPTACLE, 3P MALE
		"MIC IN"
S1	1-554-934-11	TOGGLE "POWER"
VDR91	1-806-497-00	ERZ-C05DK220
VDR92	1-806-497-00	ERZ-C05DK220



Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
AA-5	BOARD		RV1	1-228-891-00	METAL 10K
( )	A-7513-078-A	MOUNTED CIRCUIT BOARD "AA-5"	RV2	1-228-311-00	METAL 100K
			T1	1-427-487-00	OUTPUT MIC
	1-507-883-00	JACK, SMALL TYPE 4P			
C1	1-123-611-00	ELECT 1 20% 50V			
C2	1-124-135-00	ELECT 470 20% 6.3V			
C3	1-102-106-00	CERAMIC 100PF 10% 50V			
C4	1-123-617-00	ELECT 10 20% 16V			
C5	1-123-661-00	ELECT 100 20% 6.3V			
C6	1-124-142-00	ELECT 470 20% 10V			
C7	1-102-106-00	CERAMIC 100PF 10% 50V			
C8	1-123-661-00	ELECT 100 20% 6.3V			
C9	1-123-647-00	ELECT 47 20% 6.3V			
CN601	( ) 1-564-002-00	RECEPTACLE, 3P MALE			
	( ) 1-562-148-00	PLUG HOUSING 3P			
	( ) 1-562-026-00	PLUG CONTACT			
CN601	( ) 1-564-003-00	RECEPTACLE, 4P MALE			
	( ) 1-562-149-00	PLUG HOUSING 4P			
	( ) 1-562-026-00	PLUG CONTACT			
CN601	( ) 1-564-001-11	RECEPTACLE, 2P MALE			
	( ) 1-562-147-00	PLUG HOUSING 2P			
	( ) 1-562-026-00	PLUG CONTACT			
D1	8-719-143-07	RD4.3EB			
D2	8-719-815-55	1S1555			
D3	8-719-815-55	1S1555			
D4	8-719-815-55	1S1555			
D5	8-719-815-55	1S1555			
IC1	8-759-700-04	NJM2043D-D: JRC			
Q1	8-729-178-54	2SC2785			
Q2	8-769-194-00	2SK43-4			
Q3	8-729-178-54	2SC2785			
Q4	8-729-178-54	2SC2785			
Q5	8-729-178-54	2SC2785			
Q6	8-729-117-54	2SA1175			

Ref.No.	Part No.	Description	Ref.No.	Part No	Description
IF-70 BOARD			IC1	8-759-240-53	TC4053BP: TOSHIBA
( ) A-7513-093-A MOUNTED CIRCUIT BOARD			IC2	8-759-729-03	NJM2903D: JRC
"IF-70"			IC3	8-759-240-53	TC4053BP: TOSHIBA
			IC4	8-759-605-18	CX518: SONY
			IC5	8-759-729-03	NJM2903D: JRC
C3	1-123-611-00	ELECT 1 20% 50V	Q1	8-761-622-00	2SC1636
C5	1-123-607-00	ELECT 0.1 20% 50V	Q2	8-761-622-00	2SC1636
C6	1-130-483-00	MYLAR 0.01 5% 50V	Q3	8-761-622-00	2SC1636
C7	1-124-140-00	ELECT 220 20% 6.3V	Q4	8-729-178-54	2SC2785
C8	1-123-661-00	ELECT 100 20% 6.3V	Q5	8-729-178-54	2SC2785
C9	1-130-483-00	MYLAR 0.01 5% 50V	Q6	8-729-178-54	2SC2785
C10	1-123-356-00	ELECT 10 20% 16V	Q7	8-729-178-54	2SC2785
C11	1-102-947-00	CERAMIC 10PF 5% 50V	Q8	8-729-178-54	2SC2785
C12	1-123-356-00	ELECT 10 20% 16V	Q9	8-729-178-54	2SC2785
			Q10	8-729-178-54	2SC2785
			Q11	8-729-178-54	2SC2785
CN500	1-560-041-00	RECEPTACLE, 31P MALE			
CN502 ( )	1-560-357-00	RECEPTACLE, 3P MALE			
( )	1-561-515-00	PLUG HOUSING 3P	R45	1-215-453-00	METAL 22K 1% 1/6W
( )	1-560-372-00	PLUG CONTACT	R46	1-215-451-00	METAL 18K 1% 1/6W
CN503 ( )	1-564-009-00	RECEPTACLE, 10P MALE	R47	1-215-443-00	METAL 8.2K 1% 1/6W
( )	1-562-155-00	PLUG HOUSING 10P	R48	1-215-403-00	METAL 180 1% 1/6W
( )	1-564-026-00	PLUG CONTACT	R49	1-215-444-00	METAL 9.1K 1% 1/6W
CN504 ( )	1-564-003-00	RECEPTACLE, 4P MALE			
( )	1-562-149-00	PLUG HOUSING 4P			
( )	1-564-026-00	PLUG CONTACT			
CN505 ( )	1-564-004-00	RECEPTACLE, 5P MALE	RV1	1-228-472-00	METAL 2K
( )	1-562-150-00	PLUG HOUSING 5P			
( )	1-564-026-00	PLUG HOUSING			
CN506 ( )	1-564-008-00	RECEPTACLE, 9P MALE	RY1	1-515-507-00	12V 1200'
( )	1-562-154-00	PLUG HOUSING 9P			
( )	1-564-026-00	PLUG CONTACT			
CN507 ( )	1-564-001-11	RECEPTACLE, 2P MALE	S1	1-553-510-00	SLIDE
( )	1-562-147-00	PLUG HOUSING 2P			
( )	1-564-026-00	PLUG CONTACT			
D1	8-719-127-07	RD2.7EB	T1	1-427-270-XX	OUTPUT EARPHONE
D2	8-719-815-55	1S1555			
D3	8-719-815-55	1S1555			
D4	8-719-815-55	1S1555			
D5	8-719-815-55	1S1555			
D6	8-719-815-55	1S1555			
D7	8-719-127-07	RD2.7EB			
D9	8-719-815-55	1S1555			
D10	8-719-815-55	1S1555			

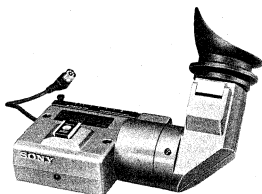
Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
PACKING MATERIAL & ACCESSORY (SUPPLIDE)			7-5. FIXTURE		

( ) 3-680-582-01	HOLDER (B), MICROPHONE
3-680-660-00	AUTO CENTERING CHART
( ) 3-680-689-01	CARTON, INDIVIDUAL
	(FOR DXC-M3AP)
( ) 3-680-691-01	CARTON, INDIVIDUAL
	(FOR DXC-M3APK)
( ) 3-680-692-01	CARTON, INDIVIDUAL
	(FOR DXC-M3AK)
( ) 3-680-693-01	CARTON, INDIVIDUAL
	(FOR DXC-M3A)
( ) 3-680-695-01	BOARD, TOP
( ) 3-680-696-01	CARTON, INDIVIDUAL
	(FOR DXC-M3AH)
( ) 3-680-697-01	CARTON, INDIVIDUAL
	(FOR DXC-M3APH)
( ) 3-680-698-01	CUSHION, LOWER
	(FOR DXC-M3AH/M3APH)
( ) 3-680-699-01	CUSHION, UPPER
	(FOR DXC-M3AH/M3APH)
( ) 3-686-251-01	CUSHION (FOR DXC-M3A/ M3AP/M3AK/M3APK)
3-701-630-00	BAG, POLYETHYLENE
	(FOR MANUAL)
3-701-639-00	BAG, POLYETHYLENE
	(FOR DXC-M3AH)
3-773-972-01	MANUAL, INSTRUCTION (J)
3-773-972-11	MANUAL, INSTRUCTION
	(EK)
3-773-972-21	MANUAL, INSTRUCTION
	(UC)

A-7511-997-A EXTENTION BOARD "EX-28"  
(OPTIONAL ACCESSORY "EB-M3")

## 1.5-INCH ELECTRONIC VIEWFINDER

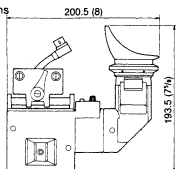
# DXF-M3A



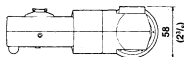
### SPECIFICATION

Picture tube	1.5-inch monochrome
Indicators	REC/TALLY indicator, BATT indicator
Signal system	CCIR standards
Scanning system	625 lines, 2:1 interlace
Resolution	400 lines
Power requirements	12 V dc
Power consumption	2.3W
Weight	Approx. 580 g (1 lb 4 oz)

### Dimensions



Unit : mm  
(inches)



# SONY®

## SERVICE MANUAL

# TABLE OF CONTENTS

## 1. GENERAL DESCRIPTION

1-1.	Location and Function of Parts and Controls ...	1-1
1-2.	How to Attach to the Camera .....	1-2
1-3.	Precautions .....	1-3
1-4.	Operation .....	1-3

## 2. ALIGNMENT

2-1.	Equipment Required .....	2-1
2-2.	Connection .....	2-1
2-3.	9V Regulator Adjustment .....	2-1
2-4.	Focus Adjustment .....	2-1
2-5.	H Hold Adjustment .....	2-2
2-6.	V Hold Adjustment .....	2-2
2-7.	Deflection Yoke Tilt Adjustment .....	2-3
2-8.	V.H Deflection Size Adjustment .....	2-3
2-9.	Centering Adjustment .....	2-4
2-10.	FB Pulse Width Adjustment .....	2-4
2-11.	Bright Cal Adjustment .....	2-4

## 3. DIAGRAM

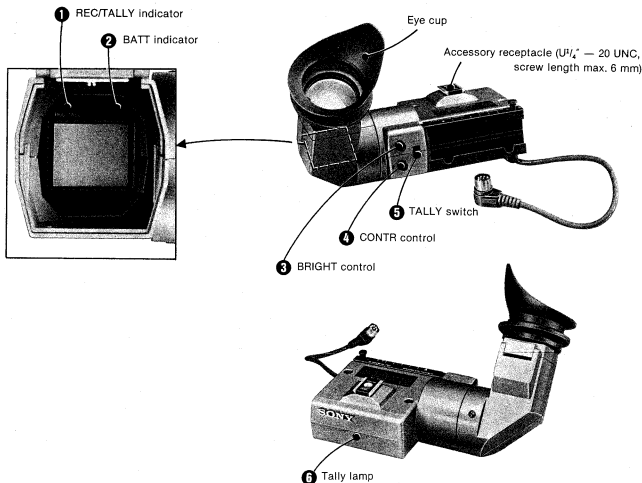
3-1.	Block Diagram .....	3-1
3-2.	Mouting Diagram .....	3-3
3-3.	Schematic Diagram .....	3-5

## 4. SPARE PARTS

4-1.	Parts Information .....	4-1
4-2.	Exploded View .....	4-3
4-3.	Electrical Parts List .....	4-5

## SECTION 1 GENERAL DESCRIPTION

### 1-1. LOCATION AND FUNCTION OF PARTS AND CONTROLS



#### ① REC/TALLY indicator

Illuminates during recording with one camera, and illuminates when the camera's picture is selected by a control console, a special-effects generator, etc., connected to the camera control unit (CCU) connected to the camera. The indicator blinks in accordance with the warning system of the VTR. (For details, refer to the instruction manual supplied with the camera.)

#### ② BATT (battery) indicator

Starts blinking several minutes before the battery of the VTR or the CCU is discharged to the level at which it cannot power the VTR or the CCU (about 11 V), and illuminates steadily when the battery has discharged to that level. (For details, refer to the instruction manual supplied with the camera.)

#### ③ BRIGHT (brightness) control

Adjusts the brightness of the picture on the viewfinder screen. To obtain a brighter picture, turn this control clockwise.

#### ④ CONTR (contrast) control

Adjusts the contrast of the picture on the viewfinder screen.

#### ⑤ TALLY switch

The tally lamp ⑥ can be turned on and off, if necessary, by setting this switch to ON or OFF.

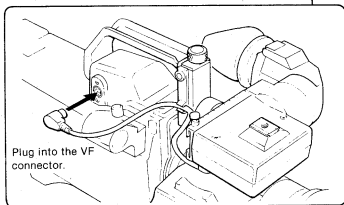
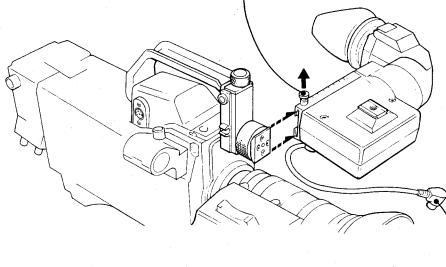
#### ⑥ Tally lamp

Illuminates when the camera's picture is selected by a control console, a special-effects generator, etc., connected to the CCU.

## 1-2. HOW TO ATTACH TO THE CAMERA

While pulling up on this stopper, align and insert into the receptacle.

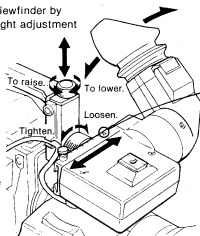
To detach the viewfinder, pull up on the stopper and slide the viewfinder to the left.



Plug into the VF connector.

Adjust the angle of the viewfinder so that the viewfinder is comfortable to use.  
The eye cup can be moved up and down.

Adjust the height of the viewfinder by turning the viewfinder height adjustment knob.



Loosen the lock ring, and slide the viewfinder to the right or left to adjust its position. Then tighten the lock ring.

To put the camera in the carrying case with the viewfinder attached to it, slide the viewfinder to the "▼" mark and tighten the lock ring.

### 1-3. PRECAUTIONS

#### On operation

- Do not use the unit in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Do not point the viewfinder directly at the sun, or the plastic inside the viewfinder may be damaged.
- Do not use the viewfinder outside the temperature extremes of  $-10^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$  ( $14^{\circ}\text{F}$  to  $113^{\circ}\text{F}$ ).
- Should any liquid or solid object fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Allow adequate air circulation to prevent internal heat build-up.
- Do not expose the unit to the extremely high temperature and humidity.

#### On cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or soft cloth lightly moistened with mild detergent solution. Do not use any type of solvent, such as alcohol or benzene, which might damage the finish.

#### On repacking

Do not discard the carton. It affords maximum protection whenever the unit is transported.

### 1-4. OPERATION

- 1 Turn on the power to the camera; the power is supplied to the viewfinder automatically.
  - 2 Adjust the position and angle of the viewfinder screen for easy viewing as shown in "HOW TO ATTACH TO THE CAMERA"
  - 3 Adjust the CONTR and BRIGHT controls for the best picture.
  - 4 While recording, the picture from the camera appears on the screen, and the REC/TALLY indicator lights.
- When the recorder is in the playback mode, the playback picture appears on the screen.
  - The settings of the CONTR and BRIGHT controls do not affect the video output signal of the camera.
  - When the BRIGHT control is turned fully counterclockwise, the picture does not appear on the screen.



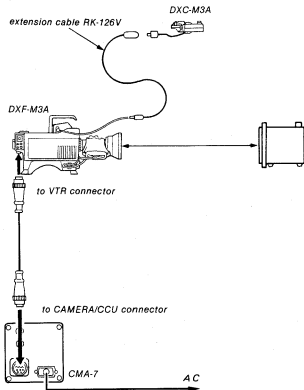
## SECTION 2

### ALIGNMENT

#### 2-1. EQUIPMENT REQUIRED

1. Pattern Box, PTB-100: SONY Parts No. J-6020-490-A
2. Resolution Pattern : SONY Parts No. J-6021-870-A
3. Dual-Trace Oscilloscope
4. Monitor TV
5. Video Camera, DXC-M3A (completed the adjustments)
6. AC Adaptor, CMA-7
7. DC Voltmeter

#### 2-2. CONNECTION



Note: Set the video camera and the pattern box at the horizontal position.

#### 2-3. 9V REGULATOR ADJUSTMENT

Equipment : DC Voltmeter  
 Test point : TP1 (GND:E1)/VF-18A board  
 Adj point : RV1/VF-18A board  
 Spec :  $9.0 \pm 0.05$  Vdc

#### 2-4. FOCUS ADJUSTMENT

Object : Resolution Pattern

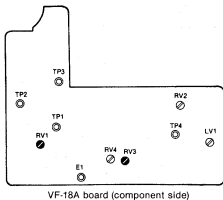
Preparation:

1. CONTRAST  $\rightarrow$
2. BRIGHTNESS  $\rightarrow$  Mechanical center
3. Using RV4 (BRIGHT)/VF-18A board, adjust the focus so that the gradation on the resolution pattern is best recognizable.

Adjustment: Shoot the resolution pattern and adjust RV3/VF-18A board for the best resolution of the viewfinder picture.

Spec	Center on the frame	Corner on the frame
Horizontal	More than 420	More than 350
Vertical	More than 350	More than 300

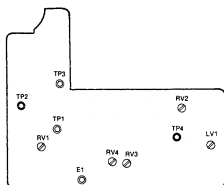
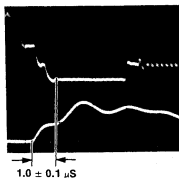
Note: After completing this adjustment, proceed to section 2-8.



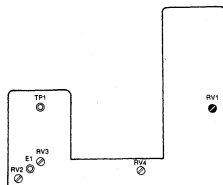
## 2-5. H HOLD ADJUSTMENT

Equipment : Dual-trace Oscilloscope  
 Test point : CH1 TP2 (GND:E1)/VF-18A board  
 CH2 TP4 (GND:chassis)/VF-18A board  
 Mode : ALT  
 Trig : TP4/VF-18A board  
 Adj point : RV1/VF-23 board  
 Spec :  $1.0 \pm 0.1 \mu\text{S}$

CH-1  
 TP2  
 (VIDEO)  
 CH-2  
 TP4  
 (FB PLUS)



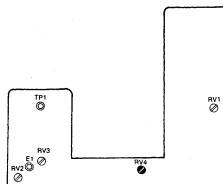
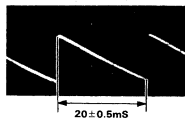
VF-18A board (component side)



VF-23 board (component side)

## 2-6. V HOLD ADJUSTMENT

Preparation: Turn "OFF" PRE HEAT switch/DXC-M3A.  
 Equipment : Oscilloscope  
 Test point : TP1/VF-23 board  
 Trig : CN1-1 pin/VF-23 board  
 Adj point : RV4/VF-23 board  
 Spec :  $20 \pm 0.5 \text{ mS}$



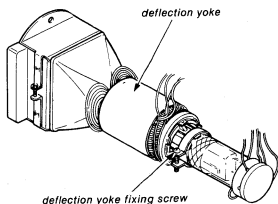
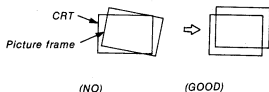
VF-23 board (component side)

## 2-7. DEFLECTION YOKE TILT ADJUSTMENT

**Note :** Since deflection yoke tilt adjustment 2-7, deflection size adjustment 2-8, and centering adjustment 2-9 affect each other, repeat the adjustments alternately until the desired values are obtained.

**Adjustment:**

1. Loosen the deflection yoke fixing screw and turn the deflection yoke until the tilt of the viewfinder picture is corrected.
2. After performing the adjustment, tighten the fixing screw while pressing the deflection yoke against the cathode-ray tube.



## 2-8. V.H DEFLECTION SIZE ADJUSTMENT

**Note :** Since deflection yoke tilt adjustment 2-7, deflection size adjustment 2-8, and centering adjustment 2-9 affect each other, repeat the adjustments alternately until the desired values are obtained.

**Object :** Resolution Pattern

**Preparation:**

1. Set the external BRIGHT and CONTR controls to the mechanical center position.
2. Adjust the lens' zoom control so that the resolution pattern fills the viewfinder screen.

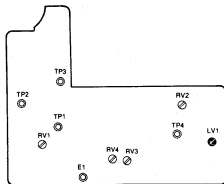
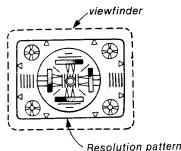
**Adjustment:**

1. The picture must be with respect to the longitudinal frame of the viewfinder and the longitudinal balance of the circle must be good.

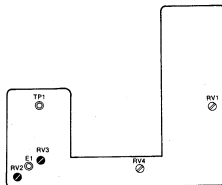
⊗ RV2/VF-23 board (V SIZE)

⊗ RV3/VF-23 board (V LIN)

2. Adjust the picture so that it is  $2 \pm 1\%$  with respect to the lateral frame of the viewfinder and the best lateral balance of the circle (LV1/VF-18A board: H LIN) is obtained.



VF-18A board (component side)

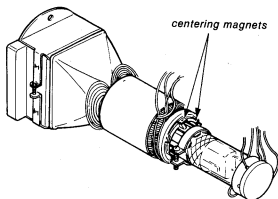


VF-23 board (component side)

## 2-9. CENTERING ADJUSTMENT

**Note :** Since deflection yoke tilt adjustment 2-7, deflection size adjustment 2-8, and centering adjustment 2-9 affect each other, repeat the adjustments alternately until the desired values are obtained.

**Adjustment:** Turn the two centering magnets until the H and V centerings are obtained.



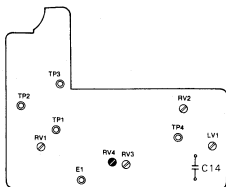
## 2-11. BRIGHT CAL ADJUSTMENT

**Object :** Resolution pattern

**Preparation:** Turn RV1/SW-91 board (BRIGHTNESS) fully counterclockwise →

Turn RV2/SW-91 board (CONTRAST) fully clockwise →

**Adjustment:** Adjust the picture by turning RV4/VF-18A counterclockwise from the rightmost position so that the black and white gradation scale is black up to the third step and the fourth step is recognizable.



VF-18A board (component side)

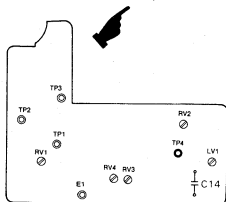
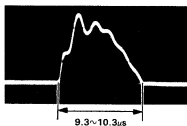
## 2-10. FB PULSE WIDTH ADJUSTMENT

**Equipment :** Oscilloscope

**Test point :** TP4 (GND:E1)/VF-18A board

**Trig :** TP4/VF-18A board

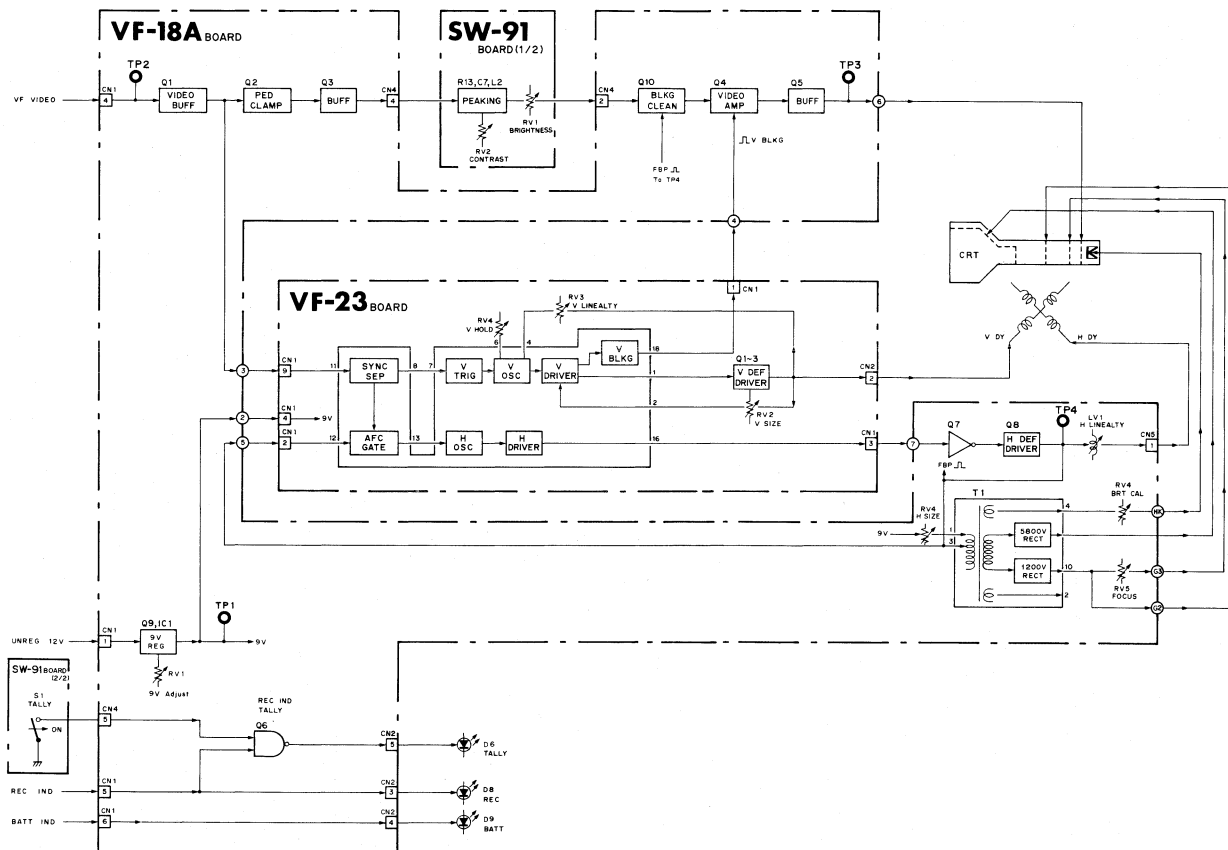
**Adjustment:** Choose 0.001 $\mu$ F, 0.0022 $\mu$ F or 0.0033 $\mu$ F for C14/VF18A board to satisfy the specification.



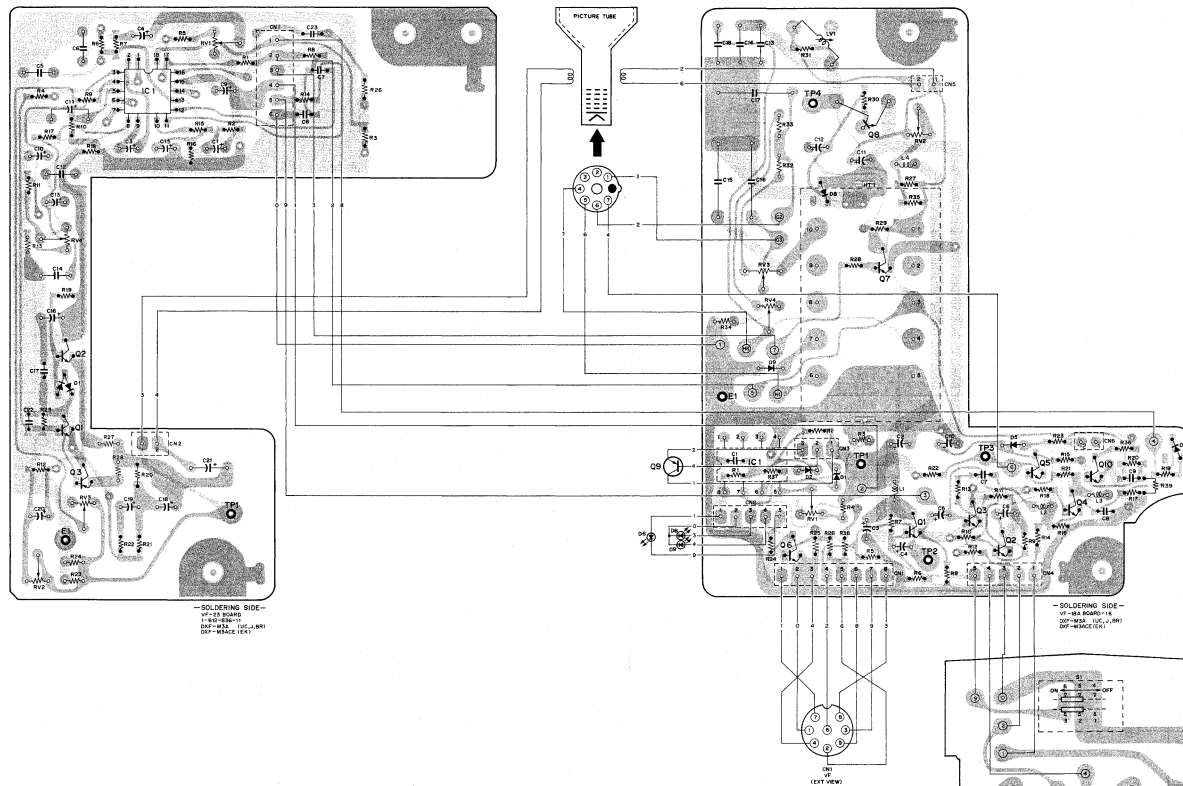
VF-18A board (component side)

### SECTION 3 DIAGRAM

#### 3-1. BLOCK DIAGRAM



## 3-2. MOUNTING DIAGRAM



**Schematic Diagram**

**VF-18A BOARD**

**VF-23 BOARD**

**SW-91 BOARD**

**NOTE:**

1. All voltages are dc, resistance 10MΩ.
2. All waveform are to be connected to the camera.
  - Set Camera "BA"
3. The shaded and A Replace only with s

1. All voltages are dc, measured with a digital volt meter (input resistance 10MΩ).
2. All waveform are taken in condition below.
  - Connect the Color camera DXC-M3.
  - Set Camera "BARS/WB" SW at BARS.
3. **The shaded and ⚠-marked components are critical to safety. Replace only with same component as specified.**


## SECTION 4

### SPARE PARTS

#### 4-1. PARTS INFORMATION

##### Notes on Repair Parts

##### (1) Safety Related Components Warning

Components identified by shading marked with  on the exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

##### (2) Standardization of Parts

Repair parts supplied from Sony Parts Center may not be always identical with the part which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".

This manual's exploded views and electrical spare parts list are indicating the parts numbers of "the standardized genuine parts at present".

##### (3) Stock of Parts

Parts marked with ( ) on the spare parts list are not normally required for routine service work. Orders for parts marked with ( ) will be processed, but allow for additional delivery time.



## DXF-M3A/M3ACE

( ) 46 3-680-605-00 CAP, SLIDE  
47 3-703-001-00 CORD, BUSHING  
48 3-703-037-00 INSULATOR, TO-220  
49 2-277-469-01 TERMINAL, VF GROUND

## 4-3. ELECTRICAL PARTS LIST

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
VF-18A BOARD			D1	8-719-100-38	RD6.2EB2
A ( ) A-7513-073-A MOUNTED CIRCUIT BOARD "VF-18A"			A D2	8-719-100-38	RD6.2EB2
C1	1-163-031-00	CERAMIC CHIP 0.01 50V	D3	8-719-100-05	1S2837
C2	1-124-139-00	ELECT 100 20% 10V	D5	8-719-100-38	RD6.2EB2
C3	1-124-139-00	ELECT 100 20% 10V	D8	8-719-100-03	1S2835
C4	1-123-647-00	ELECT 47 20% 6.3V	D9	8-719-300-76	RH1A
C5	1-123-611-00	ELECT 1 20% 50V	A HT1	1-453-097-11	HIGH VOLTAGE BLOCK
C6	1-123-617-00	ELECT 10 20% 16V	IC1	8-759-145-58	uPC4558C: NEC
C7	1-163-247-00	CERAMIC CHIP 68PF			
C8	1-163-015-00	CERAMIC CHIP 0.0033 5% 50V			
C9	1-163-227-00	CERAMIC CHIP 10PF 10% 50V			
C10	1-123-383-00	ELECT 4.7 20% 100V	L1	1-407-169-XX	MICRO 100
C11	1-131-374-00	TANTALUM 33 10% 16V	L2	1-407-165-XX	MICRO 47
C12	1-131-371-00	TANTALUM 10 10% 16V	L3	1-407-168-XX	MICRO 82
C13	1-108-369-00	MYLAR 0.0022 10% 100V	L4	1-407-169-XX	MICRO 100
C14	1-108-365-00	MYLAR 0.001 10% 100V	LV1	1-459-203-00	HLC
	1-108-367-00	MYLAR 0.0015 10% 100V			
C15	1-102-047-31	CERAMIC 0.01 1KV			
C16	1-102-047-31	CERAMIC 0.01 1KV	Q1	8-729-100-66	2SC1623
C17	1-130-802-00	POLYESTER 0.022 5% 400V	Q2	8-729-100-66	2SC1623
C18	1-108-427-00	MYLAR 0.033 10% 200V	Q3	8-729-100-66	2SC1623
CN1 ( ) 1-564-007-00 RECEPTACLE, 8P MALE	( ) 1-564-004-00 RECEPTACLE, 5P MALE	( ) 1-562-150-00 PLUG HOUSING 5P	Q4	8-729-100-66	2SC1623
			Q5	8-729-100-66	2SC1623
			Q6	8-729-100-66	2SC1623
			Q7	8-729-100-66	2SC1623
CN3 ( ) 1-564-002-00 RECEPTACLE, 3P MALE	( ) 1-562-147-00 PLUG HOUSING 2P	( ) 1-564-026-00 PLUG CONTACT	Q8	8-727-587-28	2SC756-872
			Q10	8-729-102-33	2SC2757
			R1	1-216-065-00	METAL CHIP 4.7K 5% 1/10W
			R2	1-216-043-00	METAL CHIP 560 5% 1/10W
CN4 ( ) 1-564-004-00 RECEPTACLE, 5P MALE	( ) 1-564-026-00 PLUG CONTACT	A R3	1-215-440-00	METAL 6.2K 1% 1/6W	
( ) 1-562-150-00 PLUG HOUSING 5P					
( ) 1-564-026-00 PLUG CONTACT					
CN5 ( ) 1-564-001-11 RECEPTACLE, 2P MALE					
CN6 ( ) 1-564-001-11 RECEPTACLE, 2P MALE	( ) 1-562-147-00 PLUG HOUSING 2P	A R4	1-215-430-00	METAL 2.4K 1% 1/6W	
					( ) 1-564-026-00 PLUG CONTACT
					( ) 1-562-147-00 PLUG HOUSING 2P
					( ) 1-564-026-00 PLUG CONTACT
		R5	1-216-073-00	METAL CHIP 10K 5% 1/10W	

Ref.No.	Part No.	Description
R6	1-216-089-00	METAL CHIP 47K 5% 1/10W
R7	1-216-089-00	METAL CHIP 47K 5% 1/10W
R8	1-216-061-00	METAL CHIP 3.3K 5% 1/10W
R9	1-216-069-00	METAL CHIP 6.8K 5% 1/10W
R10	1-216-071-00	METAL CHIP 8.2K 5% 1/10W
R11	1-216-049-00	METAL CHIP 1K 5% 1/10W
R12	1-216-037-00	METAL CHIP 330 5% 1/10W
R13	1-216-043-00	METAL CHIP 560 5% 1/10W
R14	1-216-049-00	METAL CHIP 1K 5% 1/10W
R15	1-216-069-00	METAL CHIP 6.8K 5% 1/10W
R16	1-216-065-00	METAL CHIP 4.7K 5% 1/10W
R17	1-216-065-00	METAL CHIP 4.7K 5% 1/10W
R18	1-216-069-00	METAL CHIP 6.8K 5% 1/10W
R19	1-216-057-00	METAL CHIP 2.2K 5% 1/10W
R20	1-216-095-00	METAL CHIP 82K 5% 1/10W
R21	1-216-025-00	METAL CHIP 100 5% 1/10W
R22	1-216-085-00	METAL CHIP 33K 5% 1/10W
R23	1-216-041-00	METAL CHIP 470 5% 1/10W
R24	1-216-049-00	METAL CHIP 1K 5% 1/10W
R25	1-216-073-00	METAL CHIP 10K 5% 1/10W
R26	1-216-073-00	METAL CHIP 10K 5% 1/10W
R27	1-216-027-00	METAL CHIP 120 5% 1/10W
R28	1-216-057-00	METAL CHIP 2.2K 5% 1/10W
R29	1-216-049-00	METAL CHIP 1K 5% 1/10W
R30	1-216-009-00	METAL CHIP 22 5% 1/10W

Ref.No.	Part No.	Description
R31	1-216-057-00	METAL CHIP 2.2K 5% 1/10W
R32	1-214-971-00	METAL 2M 1% 1/4W
R33	1-215-489-00	METAL 680K 1% 1/6W
R34	1-215-474-00	METAL 160K 1% 1/6W
R35	1-216-027-00	METAL CHIP 120 5% 1/10W
R36	1-216-061-00	METAL CHIP 3.3K 5% 1/10W
R37	1-216-049-00	METAL CHIP 1K 5% 1/10W
R38	1-216-025-00	METAL CHIP 100 5% 1/10W
RV1	1-228-888-00	METAL 1K
RV2	1-228-452-00	METAL 50
RV3	1-226-279-00	METAL 2M
RV4	1-228-897-00	METAL 470K

Ref.No.	Part No.	Description
VF-23 BOARD		
Δ	( ) A-7513-075-A	MOUNTED CIRCUIT BOARD "VF-23" (NTSC)

Ref.No.	Part No.	Description
Δ	( ) A-7513-076-A	MOUNTED CIRCUIT BOARD "VF-23" (PAL)

Ref.No.	Part No.	Description
Q1	8-729-100-66	2SC1623
Q2	8-729-100-66	2SC1623
Q3	8-729-100-76	2SA812

Ref.No.	Part No.	Description
Δ R1	1-216-109-00	METAL CHIP 330K 5% 1/10W

Ref.No.	Part No.	Description
Δ R2	1-216-083-00	METAL CHIP 27K 5% 1/10W

Ref.No.	Part No.	Description
C1	1-123-617-00	ELECT 10 20% 16V
C3	1-131-346-00	TANTALUM 0.68 10% 35V
C4	1-123-608-00	ELECT 0.22 20% 50V
C5	1-130-481-00	MYLAR 0.0068 5% 50V
C6	1-130-479-00	MYLAR 0.0047 5% 50V

Ref.No.	Part No.	Description
R3	1-216-067-00	METAL CHIP 5.6K 5% 1/10W

Ref.No.	Part No.	Description
C7	1-163-035-00	CERAMIC CHIP 0.047 50V
C8	1-163-035-00	CERAMIC CHIP 0.047 50V
C9	1-131-374-00	TANTALUM 33 10% 16V
C10	1-131-347-00	TANTALUM 1 10% 35V
C11	1-124-141-00	ELECT 330 20% 10V

Ref.No.	Part No.	Description
R4	1-216-049-00	METAL CHIP 1K 5% 1/10W
R5	1-216-075-00	METAL CHIP 12K 5% 1/10W

Ref.No.	Part No.	Description
C12	1-130-481-00	MYLAR 0.0068 5% 50V
C13	1-123-611-00	ELECT 1 20% 50V
C14	1-130-487-00	MYLAR 0.022 5% 50V
C15	1-123-617-00	ELECT 10 20% 16V
C16	1-124-139-00	ELECT 100 20% 10V

Ref.No.	Part No.	Description
R6	1-216-093-00	METAL CHIP 68K 5% 1/10W

Ref.No.	Part No.	Description
C17	1-163-031-00	CERAMIC CHIP 0.01 50V
C18	1-123-617-00	ELECT 10 20% 16V
C19	1-123-902-00	ELECT 0.68 20% 50V
C20	1-123-661-00	ELECT 100 20% 6.3V
C21	1-124-135-00	ELECT 470 20% 6.3V

Ref.No.	Part No.	Description
R7	1-216-079-00	METAL CHIP 18K 5% 1/10W

Ref.No.	Part No.	Description
C22	1-163-009-00	CERAMIC CHIP 0.001 10% 50V
C23	1-163-011-00	CERAMIC CHIP 0.0015 10% 50V

Ref.No.	Part No.	Description
R8	1-216-071-00	METAL CHIP 8.2K 5% 1/10W

Ref.No.	Part No.	Description
R9	1-216-083-00	METAL CHIP 27K 5% 1/10W

Ref.No.	Part No.	Description
R10	1-216-027-00	METAL CHIP 120 5% 1/10W

Ref.No.	Part No.	Description
R11	1-216-073-00	METAL CHIP 10K 5% 1/10W

Ref.No.	Part No.	Description
R12	1-216-097-00	METAL CHIP 100K 5% 1/10W

Ref.No.	Part No.	Description
R13	1-216-061-00	METAL CHIP 3.3K 5% 1/10W

Ref.No.	Part No.	Description
R14	1-216-025-00	METAL CHIP 100 5% 1/10W

Ref.No.	Part No.	Description
R15	1-216-025-00	METAL CHIP 100 5% 1/10W

Ref.No.	Part No.	Description
CN1	( ) 1-564-005-00	RECEPTACLE, 6P MALE
	( ) 1-562-151-00	PLUG HOUSING 6P
	( ) 1-564-026-00	PLUG CONTACT
CN2	( ) 1-564-001-0	RECEPTACLE, 2P MALE
	( ) 1-562-147-00	PLUG HOUSING 2P
	( ) 1-564-026-00	PLUG CONTACT

Ref.No.	Part No.	Description
R16	1-216-093-00	METAL CHIP 68K 5% 1/10W

Ref.No.	Part No.	Description
R17	1-216-071-00	METAL CHIP 8.2K 5% 1/10W

Ref.No.	Part No.	Description
R18	1-216-009-00	METAL CHIP 22 5% 1/10W

Ref.No.	Part No.	Description
R19	1-216-067-00	METAL CHIP 5.6K 5% 1/10W

Ref.No.	Part No.	Description
R20	1-216-081-00	METAL CHIP 22K 5% 1/10W

Ref.No.	Part No.	Description
D1	8-719-101-23	1SS123

Ref.No.	Part No.	Description
Δ IC1	8-759-300-28	HA11423MP: HITACHI

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
R21	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	SW-91 BOARD		
R22	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	( )	1-610-102-00	PRINTED CIRCUIT BOARD "SW-91"
R23	1-215-377-00	METAL 15 1% 1/6W			
R24	1-215-377-00	METAL 15 1% 1/6W (NTSC)			
R24	1-215-382-00	METAL 24 1% 1/6W (PAL)	RV1	1-230-075-00	METAL 2K "BRIGHTNESS"
R25	1-216-097-00	METAL CHIP 100K 5% 1/10W	RV2	1-230-075-00	METAL 2K "CONTRAST"
R26	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	S1	1-554-078-21	SLIDE
R27	1-247-767-00	CARBON 2.2 5% 1/6W			
R28	1-247-767-00	CARBON 2.2 5% 1/6W			
RV1	1-228-890-00	METAL 4.7K			
RV2	1-228-888-00	METAL 1K			
RV3	1-228-887-00	METAL 470			
RV4	1-228-890-00	METAL 4.7K			

## FRAME, PACKING/ACC

## DXF-M3A/M3ACE

Ref.No. Part No. Description

## VIEWFINDER FRAME

( ) 1-526-540-00 SOCKET, CRT  
 Δ ( ) 1-546-043-21 PICTURE TUBE 40LB4

CN1 1-556-889-31 8P PLUG WITH HARNESS  
 (VF)  
 CN2 1-451-233-00 DEFLECTION YOKE

D6 8-719-905-56 EBR5504S LED "TALLY"  
 D8 8-719-800-25 TLR109A "REC"  
 D9 8-719-800-25 TLR109A "BATTERY"

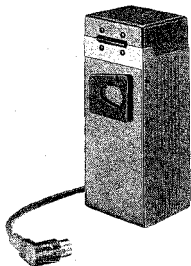
Q9 8-729-315-63 2SB856

Ref.No. Part No. Description

## PACKING MATERIAL &amp; ACCESSORIES (SUPPLIED)

( ) 2-277-467-01 CUSHION, LOWER  
 ( ) 2-381-442-00 CARTON, INDIVIDUAL  
 ( ) 2-381-443-00 CUSHION, UPPER  
 3-701-613-00 BAG, POLYETHYLENE  
 (FOR VF CONNECTOR)  
 3-701-630-00 BAG, POLYETHYLENE (FOR  
 MANUAL & DXF-M3A/M3AP)  
 3-773-950-11 MANUAL, INSTRUCTION (EK)  
 3-773-950-21 MANUAL, INSTRUCTION (UC)

## BATTERY ADAPTOR



### SPECIFICATION

Usable battery	Two NP-1 battery packs
Output voltage	11 V to 14.5 V dc
Weight	Approx. 580 g (1 lb 4 oz)
Dimensions	Approx. 91.2 × 207.5 × 91.8 mm (w/h/d) (3 5/8 × 8 1/4 × 3 5/8 inches)

## TABLE OF CONTENTS

### 1. GENERAL DESCRIPTION

1-1. Location of Parts .....	1-1
1-2. How to Attach the Battery Adaptor.....	1-1
1-3. How to Detach the Battery Adaptor .....	1-1

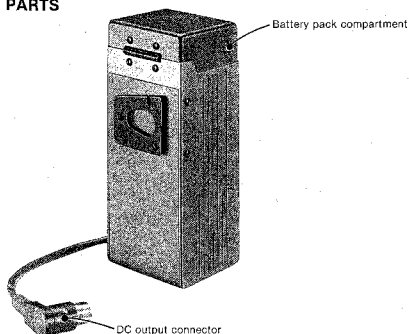
### 2. SPARE PARTS

2-1. Parts Information .....	2-1
2-2. Exploded View .....	2-1



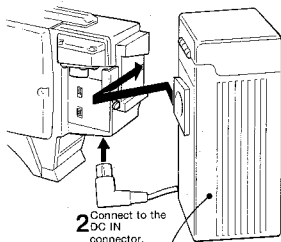
## SECTION 1 GENERAL DESCRIPTION

### 1-1. LOCATION OF PARTS



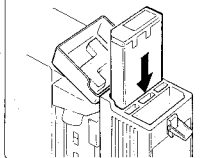
### 1-2. HOW TO ATTACH THE BATTERY ADAPTOR

- 1** Insert the battery adaptor into the battery adaptor shoe on the camera.



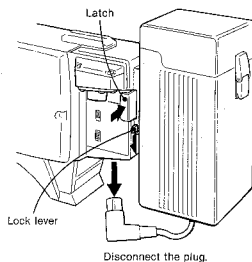
- 2** Connect to the DC IN connector.

- 3** Insert two NP-1 battery packs into the battery pack compartment.



### 1-3. HOW TO DETACH THE BATTERY ADAPTOR

- While pressing down the lock lever, push the latch in.



## SECTION 2 SPARE PARTS

### 2-1. PARTS INFORMATION

#### Notes on Repair Parts

##### (1) Safety Related Components Warning

Components identified by shading marked with **A** on the exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

##### (2) Standardization of Parts

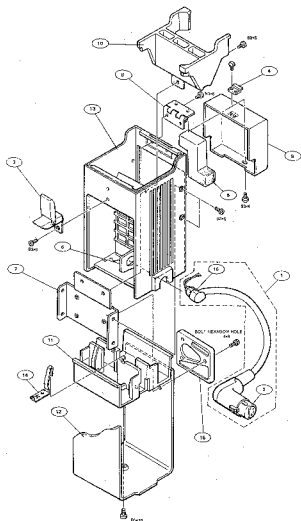
Repair parts supplied from Sony Parts Center may not be always identical with the part which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".

This manual's exploded views and electrical spare parts list are indicating the parts numbers of "the standardized genuine parts at present".

##### (3) Stock of Parts

Parts marked with ( ) on the spare parts list are not normally required for routine service work. Orders for parts marked with ( ) will be processed, but allow for additional delivery time.

### 2-2. EXPLODED VIEW



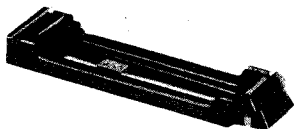
No.	Parts no.	Description
1	1-557-553-11	CORD (WITH ROUND CONNECTOR) 4P
3	( ) 2-266-239-01	STOPPER (A), LID P TYPE
4	( ) 2-266-240-01	STOPPER (B), LID P TYPE
5	( ) 2-381-449-01	CUSHION, BATT
6	( ) 2-381-450-01	PLATE, CLAMP, CORD
7	( ) 2-381-451-01	BRACKET, SHOE
8	( ) 2-381-452-01	HINGE
9	( ) 2-381-453-01	BATT, LID
10	( ) 2-381-454-01	GUIDE, BATTERY
11	( ) 2-381-455-01	CASE, CONTACT
12	( ) 2-381-456-01	COVER, CASE
13	( ) 2-381-457-01	CASE, BATT
14	3-676-314-01	CONTACT
15	( ) 3-680-682-02	SHOE, BATT
16	3-703-001-01	BUSHING, CORD

#### PACKING

2-266-234-01	CARTON, INDIVIDUAL
2-381-459-01	CUSHION, UPPER
2-381-460-01	CUSHION, LOWER
3-701-625-01	BAG POLY

# VCT-M3

## TRIPOD ADAPTOR



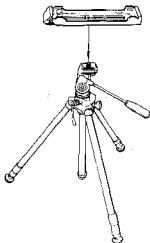
### SPECIFICATION

Weight	Approx. 530 g (1 lb 3 oz)
Dimensions	Approx. 100 × 40 × 311 mm (w/h/d) (4 × 1½ × 12¼ inches)

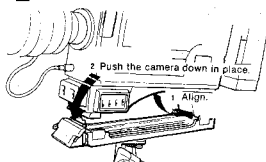
**SONY**  
**SERVICE MANUAL**

## HOW TO USE

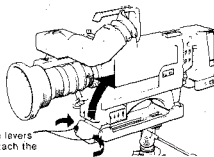
- 1 Attach the tripod adaptor to the tripod.



- 2 Attach the camera to the tripod adaptor.

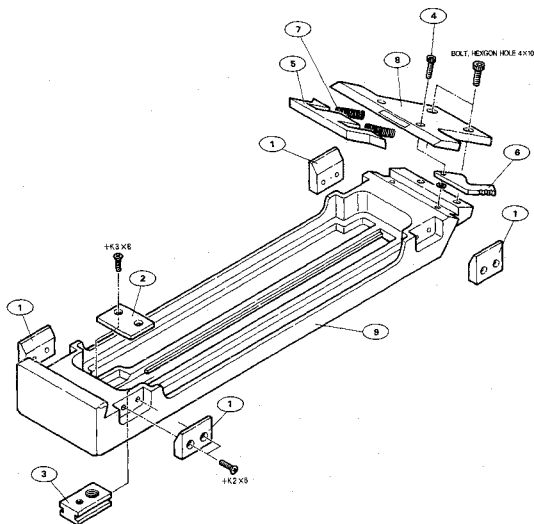


### How to detach the camera



While pushing the levers in, pull up and detach the camera.

## SPARE PARTS



No.	Parts No.	Description
( ) 1	2-381-601-00	GUIDE, CAMERA
( ) 2	2-381-602-00	STOPPER, SCREW
( ) 3	2-381-603-00	SPACER, SLIDE
( ) 4	2-381-604-00	SPACER, SCREW, SLIDE
( ) 5	2-381-605-00	BOLT, LEVER SHAFT
( ) 6	2-381-606-00	LOCK, SLIDE
( ) 7	2-381-607-00	LEVER, SLIDE
( ) 8	2-381-608-00	SPRING, SLIDE LOCK
( ) 9	2-381-609-00	RETAINER, SLIDE LOCK
( )	2-381-609-00	TRIPOD (MAIN)

## Parts No. Description

## FACING MATERIAL

( )	2-381-613-00	INDIVIDUAL CARTON
( )	2-381-611-00	CUTION
( )	2-381-612-00	SPACER

## NOTE:

1. Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

## ZOOM LENS

# VCL-915BY



### SPECIFICATION

**Zoom lens (VCL-915BY)**

Focal length	9.5 mm to 143 mm
Zoom	Manual and motorized, selectable
	Zooming ratio: 15 x
Maximum aperture ratio	1.8
Iris control	Manual and auto, selectable
	1.8 to 16 and C (closed)
Range of object field (at the distance of 1 meter)	
W (wide angle):	647 × 862 mm (25½ × 34 inches)
T (telephoto):	43 × 57 mm (1¾ × 2¼ inches)
Minimum object distance	1 meter
Filter thread	86 mm dia.
Mount	Bayonet mount
Weight	Approx. 1.6 kg (3 lb 9 oz) with hood
Dimensions	Approx. 120 mm dia. × 189 mm (4¾ × 7½ inches)

**SONY®**  
**SERVICE MANUAL**

## TABLE OF CONTENTS

### 1. GENERAL DESCRIPTION

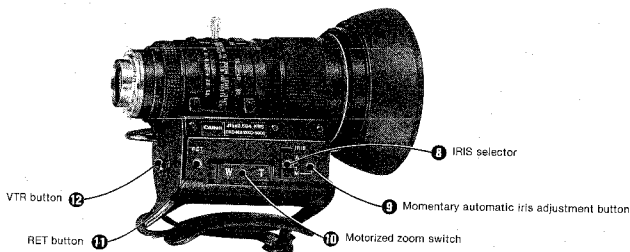
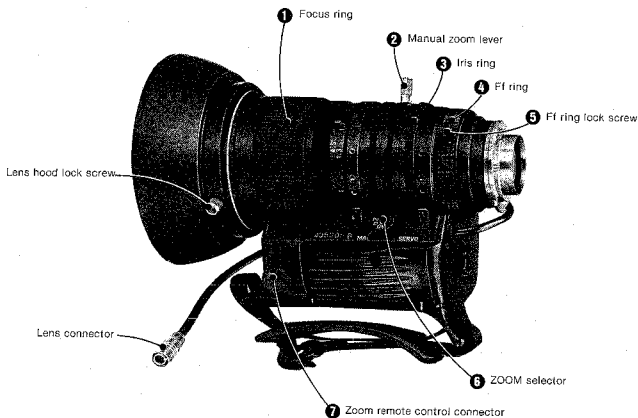
- 1-1. Location and Function of Controls ..... 1-1
- 1-2. How to Attach the Lens ..... 1-3

### 2. SPARE PARTS

- 2-1. Exploded View ..... 2-1

## SECTION 1 GENERAL DESCRIPTION

### 1-1. LOCATION AND FUNCTION OF CONTROLS





**① Focus ring**

Turn this ring for focusing.

**② Manual zoom lever**

For manual zooming, turn this lever with the ZOOM selector set to MANU.

**③ Iris ring**

For manual iris adjustment, turn this ring with the IRIS selector set to M.

**④ Ff (flange focal length) adjustment ring**

Turn to adjust the flange focal length. See page 1-23.

**⑤ Ff (flange focal length) adjustment ring lock screw**

Locks the Ff ring at the adjusted position.

**⑥ ZOOM selector**

**SERVO:** For motorized zooming.

**MANU:** For manual zooming.

**⑦ Zoom remote control connector (8-pin)**

Connect an LO-26 lens remote control unit (optional) for remote control of zooming when the camera is attached to the tripod.

**⑧ IRIS adjustment selector**

**A:** For automatic iris adjustment.

**M:** For manual iris adjustment.

**⑨ Momentary automatic iris adjustment button**

The iris is automatically adjusted while this button is kept depressed, when the IRIS selector is set to M. When the button is released, the iris will be fixed at the value that has just been obtained until the iris is adjusted again manually.

**⑩ Motorized zoom switch**

Press either end of this switch for motorized zooming with the ZOOM selector set to SERVO: W for a wide-angle picture and T for a telephoto picture. Zooming is fast when the switch is pressed down all the way and slower when the switch is pressed down only slightly.

**⑪ RET (return video) button**

Press to view the picture from the VTR during recording, the playback picture during playback, or the signal from the CCU-M3 camera control unit on the viewfinder screen. This button has the same function as the VTR START/RETURN VIDEO button of the camera (return video switch) when a CCU-M3 is connected.

**⑫ VTR button**

When a portable VTR is connected to the camera, press this button to start and stop recording. This button has the same function as the VTR START/RETURN VIDEO button of the camera (start switch).

## 1-2. HOW TO ATTACH THE LENS

**1** Loosen the mount clamp ring.

To protect the pickup tubes,  
set the filter to 0 (blind).

**3** Tighten the mount clamp ring  
to secure the lens.

**2** Align and insert the lens into  
the lens mount.

**4** Insert the plug into  
the LENS connector.

**5** Secure the cord with  
the cord clamps.

Set the PREHEAT  
switch to PREHEAT.

Cord clamps (on the opposite side)

### Notes

- The camera's lens mount is a bayonet mount.
- If the protective cap is placed over the mount of the lens, remove it before attaching the lens.

### How to attach a filter to the lens

As a filter is attached to the lens hood, we recommend detaching the lens hood from the lens first for easier attachment of the filter. Loosen the lens hood lock screw and detach the lens hood.

#### To use a threaded filter

Unscrew the filter holder ring from the lens hood. Then screw the filter into the lens hood. If the filter holder ring is not removed, shading may occur in part of the picture.

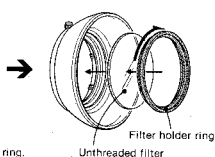
#### To use an unthreaded filter

Unscrew the filter holder ring from the lens hood. Put the filter into the lens hood, then screw the filter holder ring back onto the lens hood.

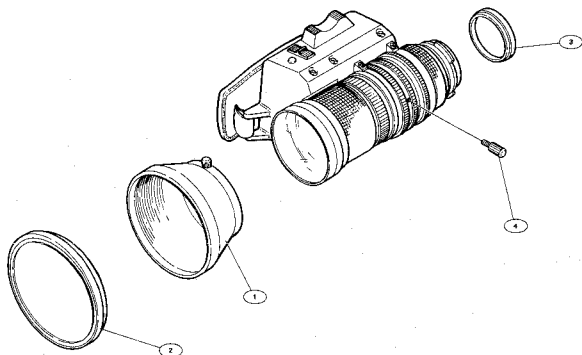
Lens hood lock screw



Detach the filter holder ring.



Unthreaded filter

SECTION 2  
SPARE PARTS2-1. EXPLODED VIEW  
LENS  
VCL-915BY

No.	Parts No.	Description
1	3-707-033-01	HOOD
2	3-707-034-01	CAP, HOOD
3	3-707-035-01	CAP, RAST
4	3-707-037-01	LEVER, ZOOM

MF "SATICON" COLOR VIDEO CAMERA  
ELECTRONIC VIEWFINDER  
BATTERY ADAPTOR  
TRIPOD ADAPTOR

**DXC-M3A**  
**DXF-M3A**  
**DC-8**  
**VCT-M3**  
**VCL-915BY**

## SUPPLEMENT-1

### — CHANGE INFORMATION —

	CONTENTS
DXC-M3A	<ul style="list-style-type: none"><li>◦ SECTION 2 INSTALLATION<ul style="list-style-type: none"><li>2-5. System Block Diagram (page 2-12~2-14)</li><li>2-6. Self-Check Function For Auto-Control System (page 2-15~2-18)</li></ul></li><li>◦ SECTION 4 ALIGNMENT<ul style="list-style-type: none"><li>4-5. Registration System (page 4-24, 4-29, 4-32)</li><li>4-7. Automatic Control System (page 4-50, 4-51)</li><li>4-8. Intercom System (page 4-52)</li></ul></li><li>◦ SECTION 5 DIAGRAM<ul style="list-style-type: none"><li>IE-7 BOARD (page 5-32~5-37)</li><li>DF-20 BOARD (page 5-53~5-57)</li><li>SG-1A BOARD (page 5-69~5-70)</li><li>IF-70 BOARD (page 5-78~5-83)</li></ul></li></ul>
DXF-M3A	<ul style="list-style-type: none"><li>◦ SECTION 2 ALIGNMENT<ul style="list-style-type: none"><li>2-10. FB PULSE WIDTH ADJUSTMENT (page 2-4)</li></ul></li><li>◦ SECTION 3 DIAGRAM<ul style="list-style-type: none"><li>3-3. SCHEMATIC DIAGRAM (page 3-5~3-6)</li></ul></li></ul>

## 2-4. SIMPLE ALIGNMENT

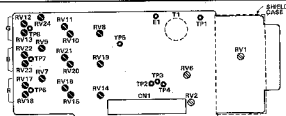
### PS-15

#### [BEAM] (RV13, RV18 & RV23)

Control the beam amount of the channels by setting the G1 electrode voltage. Set the [ABC] controls on the PS-15 board to the counterclockwise fully, shoot the gray scale chart, and adjust the RVs so that the waveforms at the input terminals (Pins 27, 23 and 25 of extension board) on the PS-15 board are not clipped to 1.0 Vp-p.

**[ABO] BLACK CLIP** (RV8, RV14 & RV19)  
**ABO GAIN** (RV11, RV16 & RV21)  
**KNEE SLOPE** (RV12, RV17 & RV22)  
**KNEE SLOPE** (RV24, RV7 & RV9)  
**WHITE CLIP** (RV10, RV15 & RV20)

Prevent a beam shortage of the pickup tube and oscillation when the iris is opened for 8 times of the normal video output level.



PS-15 Board (Component side)

	GREEN	RED	BLUE
Normal video level	0.4 V	0.4 V	0.4 V
8 times	3.0 V	2.5 V	2.5 V
Adjust point	TP8	TP6	TP7

### PS-26

#### [E FOCUS] (RV1 through RV3)

Control the beam focusing of the channels by setting the focusing coil current. Shoot the multi-bar chart and adjust the RVs so that the signal voltage amplitude is at 6 MHz is maximized.



PS-26 Board (Component side)

### AT-31

#### [IRIS SET] (RV2)

#### [IRIS MODE] (RV1)

Adjust the deflection method of the video level and the sensitivity for the signal when the lens iris is set to "AUTO". The peak level detection is selected when the IRIS MODE is at the fully counterclockwise position and the average level detection is selected at its fully clockwise position. Set the RV1 to the max position, shoot the gray scale chart and adjust the RV2 so that the white portion of the gray scale chart is 700mVp-p.

#### [ABL] (RV6)

Control the black level of the composite video signal. Shoot the gray scale chart, and adjust the RV6 so that the black portion of the gray scale chart does not change when selecting the ABL switch from ON to OFF or vice versa.

#### [LOW LIGHT] (RV2)

Control the average deflection level of the IRIS MODE. Shoot the gray scale chart, and adjust the RV2 so that the "LOW LIGHT" is indicated in the viewfinder when the white level is 280mVp-p by using lens iris.



AT-31 Board (Component side)

### DF-20

#### Registration adjustment

#### [V CENT (R,B)]

#### [V SKEW (R,B)]

#### [V BOW (R,B)]

#### [HIGHT (R,B)]

#### [V LIN (R,B)]

#### [H CENT (R,B)]

#### [H SKEW (R,B)]

#### [H BOW (R,B)]

#### [WIDTH (R,B)]

#### [H LIN (R,B)]

#### [H SKEW (R,B)]

#### [H BOW (R,B)]

#### [WIDTH (R,B)]

#### [H LIN (R,B)]

#### [H SKEW (R,B)]

#### [H BOW (R,B)]

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#### [H LIN (R,B)]

#### [H SKEW (R,B)]

#### [H BOW (R,B)]

#### [WIDTH (R,B)]

#### [H LIN (R,B)]

#### Shading adjustment

#### [H SAW] (RV18 through RV18)

#### [H PARA] (RV23 through RV25)

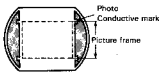
#### [V SAW] (RV30 through RV32)

#### [V PARA] (RV37 through RV39)

Adjust the black level shading of the channels so that the video signal waveforms are as flat as possible. Prior to the adjustment, set the GAIN switch to "18dB".

#### [BLACK SET] (RV40 through RV42)

Function so that the pedestals of the channels do not vary even when the GAIN switch is switched from 0 dB to 18 dB or vice versa.



DF-20 Board (Component side)

### PR-61

#### LEVEL (RV1, RV5 & RV11)

Shoot the gray scale chart, adjust the video levels of the channels as follows:

	GREEN	RED	BLUE
lens iris	400mVp-p (At TP1)		
Adjust point	TP2	TP11	TP10
Spec	800mVp-p	270mVp-p	

#### [SUB GAIN (R&G)] (RV12 & RV6)

Control the video level for the preset mode. Shoot the gray scale chart, and adjust RV6 so that the carrier leakage in the white portion is minimized.

#### [WHITE CLIP] (RV17 through RV18)

Control the white clips of the channels. Shoot the gray scale chart, adjust the white clip of G channel to 800mV at monitor out by using RV17 and then minimize the carrier leakage in the white portion at the composite video signal output by using RV18 and RV19.

#### [PED] (RV2, RV7 & RV13)

Control the pedestal level of the channels. Shoot the gray scale chart, adjust the pedestal level of G channel to 400mV at monitor out by using RV2 and then minimize the carrier leakage in the pedestal at the composite video signal output by using RV7 and RV13.

#### [Gamma adjustment]

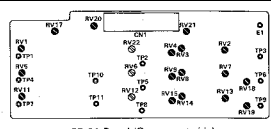
Adjust the gamma curves of the channels so that the video signal waveform of each channel is the linear change staircase waveform when the logarithmic gray scale chart is shot.

#### [GAMMA BAL] (RV3, RV8 & RV14)

When RV4 is turned on fully clockwise and counterclockwise, adjust RV3 so that the white level is state. Then, adjust RV8 and RV14 alternately and repeatly two or three times so that the carrier leakage in the 11-step of gray scale waveform signal is minimized.

#### [GAMMA ADJ] (RV4, RV9 & RV15)

When the white level is 700mV, gamma correction intersecting point is 385mV at G channel by using RV4, and then adjust RV9 and RV15 so that the carrier leakage in the 3 to 4 steps of gray scale waveform signal is minimized.



PR-61 Board (Component side)

#### [BARS LEVEL] (RV21)

Control the BARS level of the channels. Adjust RV21 so that the BARS level is 1.4Vp-p at TP3.

#### [BARS WIDTH] (RV20)

Control the BARS width of the channels. Adjust RV20 so that the black portion of color bar is 3.5%.

### EN-28A

#### [SPLIT] (RV15)

Control the I and Q phase of the bars signal. Adjust the ratio of I and Q signal width to the color bar size within a horizontal trace time to 8.4 using RV14.

#### [COLOR BAR] (RV5, RV8 & RV16)

- Adjust the gray signal level at 540mV using RV8.
- Adjust the white peak level at 700mV using RV16.
- Adjust the synchronizing level at 300mV using RV5.

#### [BLACK BAL (L)] (RV2 & RV4)

Adjust RV2 and RV4 alternately and observe the output video signal corresponding to the black portion. The adjustment should be minimized the carrier leakage.

#### [BURST LEVEL] (RV19)

#### [CHROMA LEVEL, G (V) GAIN] (RV11, RV1 & LV1)

Control the chroma phase and level. Adjust the burst level at 75% scale marker position using RV19. Adjust RV1, RV11 and LV1 alternately so that the chroma spots are located within the specified area on the vectorscope.

#### [ZEBRA] (RV9)

Adjust RV9 so that the 500mV section is displayed on the viewfinder screen as a zebra pattern when the ZEBRA ON/OFF switch turns on.

#### [INT SC PHASE] (RV14)

Adjust the sub-carrier phase of the output video signal.

#### [EXT SC PHASE] (RV13)

RV13 and S2 adjust the sub-carrier phase of the output video signal at genlock and the adjustable range is 360 degrees.

#### [H PHASE] (RV12)

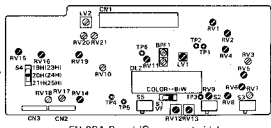
RV12 adjusts the horizontal phase of the output video signal at genlock.

#### [V BLKG WIDTH] (S4)

S4 adjusts the V BLKG width at 10H, 20H or 21H.

#### [VE] (S1)

S1 changes the BW or COLOR on the viewfinder screen.



EN-28A Board (Component side)

### IE-7

#### [DET] (RV7)

Adjust the level of the detail signal superimposed on the output video signal.

#### [CHISE] (RV6)

Adjust the level for rejecting the noise component in the detail signal so that the noise of overall video signal reduces.

#### [L.V. RATIO] (RV3)

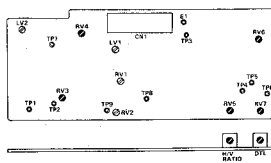
Adjust the balance of the horizontal and vertical of the detail signals.

#### [APC] Automatic Phase Control (RV4)

Control the phase of G channel signal. Shoot the gray scale chart, adjust the ratio of the white level to the reference pulse in the synchronizing signal time to 3:1 at TP1 using RV4.

#### [AGC] Automatic Gain Control (RV3)

Control the gain of G channel signal. Shoot the gray scale chart, adjust the white level at TP2 to 0.6 Vp-p using RV3.



IE-7 Board (Component side)

# R-61

**VEL** (RV1, RV5 & RV11)

Shoot the gray scale chart, adjust the video levels of the channels as follows.

	GREEN	RED	BLUE
is the	400mVp-p (At TP1)		
Just point	TP2	TP1	TP10
ac	800mVp-p	370mVp-p	

**B GAIN (BAR)** (RV12 & RV6)

Control the video level for the preset mode. Shoot the gray scale chart, and adjust RVs so that the carrier leakage in the white portion is minimized.

**ITE CLIP** (RV17 through RV19)

Control the white clips of the channels. Shoot the gray scale chart, adjust the white clip of G channel to 800mV at monitor out, using RV17 and then minimize the carrier leakage in the white clip at the composite video signal output by using RV18 and /19.

**PED** (RV2, RV7 & RV13)

Control the pedestal level of the channels. Shoot the gray scale chart, adjust the pedestal level of G channel to 40mV at monitor out by using RV2 and then minimize the carrier leakage in the pedestal at the composite video signal output by using RV7 and RV13.

**Gamma adjustment**

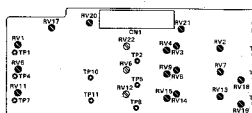
Adjust the gamma curves of the channels so that the video signal waveform of each channel is the linear change staircase waveform when the logarithmic gray scale chart is shot.

**GAMMA BAL** (RV3, RV8 & RV14)

When RV4 is turned on fully clockwise and counterclockwise, adjust RV3 so that the white level is stable. Then, adjust RV8 and RV14 alternately and repeatedly two or three times so that the carrier leakage in the 11-step of gray scale waveform signal is minimized.

**GAMMA ADJ** (RV4, RV9 & RV15)

When the white level is 700mV, gamma correction intersecting point is 385mV at G channel by using RV4, and then adjust RV9 and RV15 so that the carrier leakage in the 3 to 4 steps of gray scale waveform signal is minimized.



PR-61 Board (Component side)

**BARS LEVEL** (RV21)

Control the BARS level of the channels. Adjust RV21 so that the BARS level is 1.4Vp-p at TP3.

**BARS WIDTH** (RV20)

Control the BARS width of the channels. Adjust RV20 so that the black portion of color bar is 2.5µs.

## EN-28A

**SPLIT** (RV15)

Control the I and Q phase of the bars signal. Adjust the ratio of I and Q signal width to the color-bar size within a horizontal trace time to 5:4 using RV14.

**COLOR BAR** (RV5, RV8 & RV16)

- Adjust the gray signal level at 640mV using RV5.
- Adjust the white peak level at 700mV using RV16.
- Adjust the synchronizing tip level at 300mV using RV8.

**BLACK BAL (Q)** (RV2 & RV4)

Adjust RV2 and RV4 alternately and observe the output video signal corresponding to the black portion. The adjustment should be minimized the carrier leakage.

**BURST LEVEL** (RV19)

**CHROMA LEVEL Q (V) GAIN** (RV11, RV1 & LV1)

Control the chroma phase and level.

Adjust the burst level at 75% scale marker position using RV19. Adjust RV1, RV11 and LV1 alternately so that the chroma spots are located within the specified area on the vectorscope.

**ZEBRA** (RV9)

Adjust RV9 so that the 500mV section is displayed on the viewfinder screen as a zebra pattern when the ZEBRA ON/OFF switch turns on.

**INT SC PHASE** (RV14)

Adjust the sub-carrier phase of the output video signal.

**EXT SC PHASE** (RV13)

RV13 and S2 adjust the sub-carrier phase of the output video signal at genlock and the adjustable range is 360 degree.

**H PHASE** (RV12)

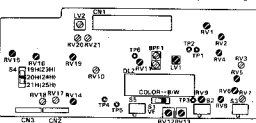
RV12 adjusts the horizontal phase of the output video signal at genlock.

**V BLK WIDTH** (S4)

S4 adjusts the V BLK width at 19H, 20H or 21H.

**VE** (S1)

S1 changes the B/W or COLOR on the viewfinder screen.



EN-28A Board (Component side)

## IE-7

**DTL** (RV7)

Adjust the level of the detail signal superimposed on the output video signal.

**CHRP** (RV6)

Adjust the level for rejecting the noise component in the detail signal so that the noise of overall video signal reduces.

**H/V RATIO** (RV5)

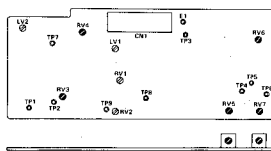
Adjust the balance of the horizontal and vertical of the detail signals.

**APC** Automatic Phase Control (RV4)

Control the phase of G channel signal. Shoot the gray scale chart, adjust the ratio of the white level to the reference pulse in the synchronizing signal time to 3:1 at TP1 using RV4.

**AGC** Automatic Gain Control (RV3)

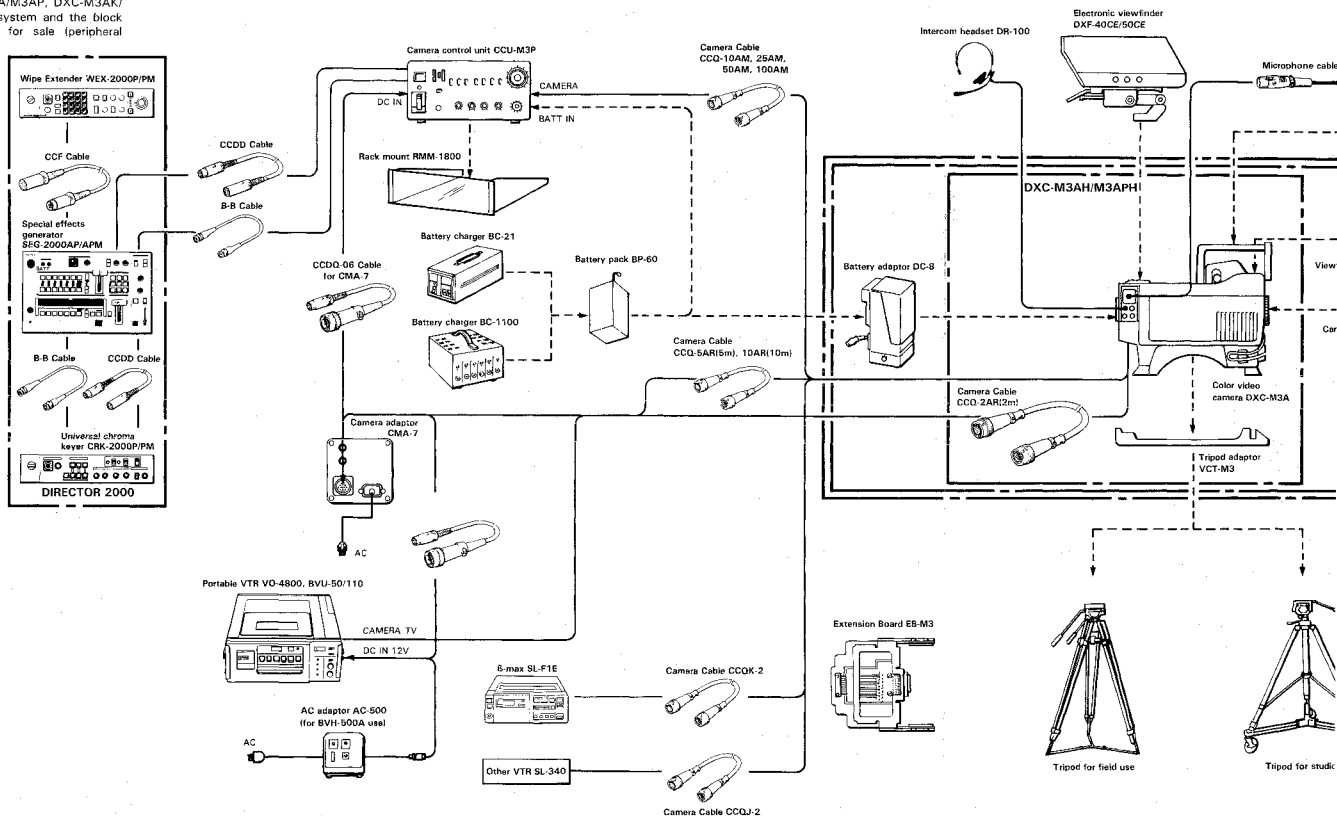
Control the gain of G channel signal. Shoot the gray scale chart, adjust the white level at TP2 to 0.6 Vp-p using RV3.

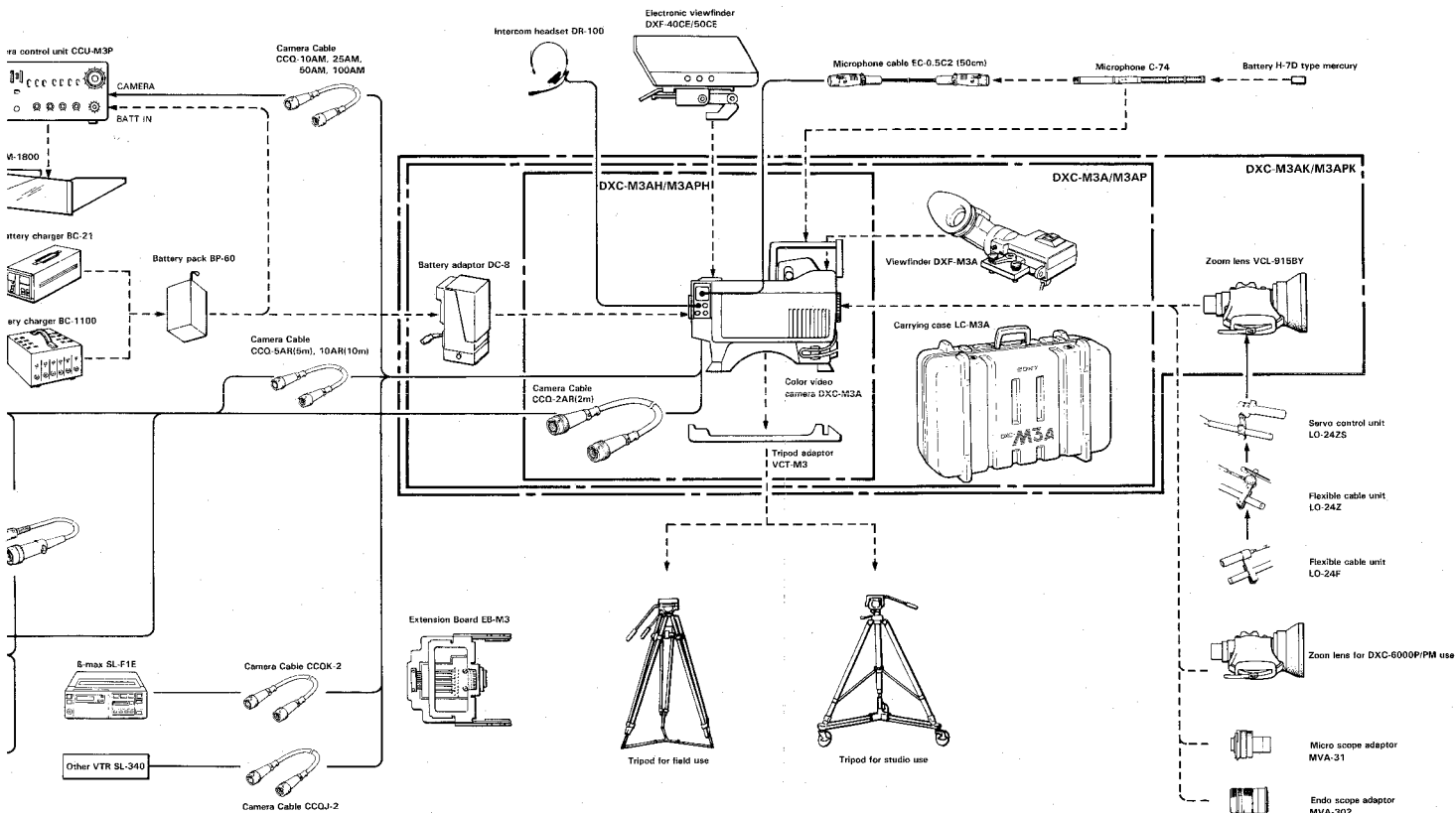


IE-7 Board (Component side)

## 2-5. SYSTEM BLOCK DIAGRAM

The configuration of the DXC-M3A/M3AP, DXC-M3AK/M3APK and DXC-M3AH/M3APH system and the block diagram of separate accessories for sale (peripheral devices) are shown.








## 2-6. SELF-CHECK FUNCTION FOR AUTO-CONTROL SYSTEM

### 2-6-1. Indications and Meanings of the Term NG in the Auto-Centering Operation

View-finder screen	Meanings
<div data-bbox="200 375 399 521" style="border: 1px solid black; padding: 10px; text-align: center;">           CENT: NG            : OBJECT?                n            TRY AGAIN         </div>	<p>Meanings of indications :</p> <ul style="list-style-type: none"> <li>•n=00 ➡ The number of horizontal gate pulses are 255 or less in one horizontal time period.</li> <li>•n=01 ➡ The number of vertical gate pulses are 15 or less in one vertical time period.</li> <li>•n=02 ➡ The number of cross-points in the signal waveform are two or more while the multiburst chart is taken.</li> </ul> <p>Note: If the number of horizontal gate pulses are 255 or less and the number of vertical gate pulses are 15 or less, the indication is n=01.</p>
<div data-bbox="200 671 399 816" style="border: 1px solid black; padding: 10px; text-align: center;">           CENT: NG            : CIRCUIT NG?            DET n            TRY AGAIN         </div>	<p>Preparation: Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Meanings of indications :</p> <ul style="list-style-type: none"> <li>•n=00 ➡ The error voltage of R-G or B-G is less than 1 and then the control data bit is shifted by +1 or -1 depending on the error voltage polarity, but the polarity of the error voltage is not inverted. ex. The sample and hold circuit does not work.</li> <li>•n=01 ➡ The gate pulse counter always overflows. (Normally this counter is reset after it counts 16 gate pulses. In this condition it does not reset.) ex. The gate pulse counter does not work.</li> </ul> <p>Note: After completing this check, remove the jumper wire connection TP8/AT-31 board to E1/AT-31 board.</p>
<div data-bbox="200 963 399 1109" style="border: 1px solid black; padding: 10px; text-align: center;">           CENT: NG            : OBJECT?                n            TRY AGAIN         </div>	<p>Meaning of indications :</p> <ul style="list-style-type: none"> <li>•n=10 ➡ B-H CENT: NG</li> <li>•n=11 ➡ B-V CENT: NG</li> <li>•n=12 ➡ B-H CENT: NG</li> <li>•n=15 ➡ B-H CENT: NG</li> </ul> <p>i) Even if the control data are changed, the error voltage of R-G or B-G does not change. ex. Malfunction in the control system, or the centering control signal path is open.</p> <p>ii) The error is out-of-range of the auto-centering control.</p> <p>iii) A highly saturated color in the object at which aim is being.</p>

## 2-6-2. Indications and Meanings of the Term NG in the Auto-White Balance Operation

View-finder screen	Meanings
<div data-bbox="151 336 348 481"> <p>WHT: NG : LOW LIGHT TRY AGAIN</p> </div>	<p>Cause: The auto-white balance operation under LOW LIGHT conditions.</p>
<div data-bbox="151 620 348 765"> <p>WHT: NG : CIRCUIT NG? DET n TRY AGAIN</p> </div>	<p>Preparation: Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Meanings of indications:</p> <ul style="list-style-type: none"> <li>• n=00 → R gain control system</li> <li>• n=01 → B gain control system</li> </ul> <p>Effect: The polarity of the error voltage of R-G or B-G is not inverted even though the control data is shifted by +1 or -1 when the error voltage is within <math>\pm 1</math> bit.</p> <p>ex. The sample and hold circuit does not work and the error voltage of R-G or of B-G is always 0V.</p> <p>Note: After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>
<div data-bbox="151 955 348 1100"> <p>WHT: NG : CIRCUIT NG? CTL n TRY AGAIN</p> </div>	<p>Preparation: Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Meanings of indications:</p> <ul style="list-style-type: none"> <li>• n=00 → R gain control system</li> <li>• n=01 → B gain control system</li> </ul> <p>Effect: The error voltage of R-G or B-G does not change even though the control voltage is changed when the error voltage is not within <math>\pm 1</math> bit.</p> <p>ex. Malfunction in the R-ch or B-ch gain control system.</p> <p>Note: After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>

<div data-bbox="194 307 392 452"> WHT: NG  : C. TEMP. LOW  CHG. FILTER  TRY AGAIN </div> <div data-bbox="194 477 392 623"> WHT: NG  : C. TEMP. HI  CHG. FILTER  TRY AGAIN </div>	<p>Effect :  The control data do not settle down to a value between 00 and FF even though the error voltage of R-G or B-G changes with a deviation in the control voltage.</p>
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### 2-6-3. Indications and Meanings of the Term NG in the Auto-Black Balance Operation

View-finder screen	Meanings
<div data-bbox="194 816 392 962"> BLK: NG  : LENS CLOSE?  TRY AGAIN </div>	<p>Effect : The video level on G-ch does not fall.</p> <p>Cause :   •The lense connector is disconnected.  •The iris close mechanism for the lense does not work.</p>
<div data-bbox="194 1064 392 1209"> BLK: NG  : CIRCUIT NG?  DET 01  TRY AGAIN </div>	<p>Preparation :  Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.</p> <p>Effect : The difference of the black level is not changed by the corrective control data when the gain difference of the black level is in the range 0 dB to 18 dB.</p> <p>Causes : Malfunction in the sample and hold system.</p> <p>Note : After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>

BLK: NG  
: CIRCUIT NG?  
DET n  
TRY AGAIN

**Preparation:**

Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.

**Meanings of indications:**

- n=08 → R-ch pedestal system
- n=09 → B-ch pedestal system

**Effect:** The polarity of the error voltage of R-G or B-G is not inverted even though the control voltage is changed when the error voltage is within  $\pm 1$  bit.

**Cause:** The sample and hold circuit does not work etc.

**Note:** After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.

BLK: NG  
: CIRCUIT NG?  
CTL n  
TRY AGAIN

**Preparation:**

Connect TP8/AT-31 board to E1/AT-31 board by means of a jumper wire so that TP8/AT-31 is grounded.

**Meanings of indications:**

- n=02 → R-ch
- n=03 → B-ch
- n=06 → G-ch

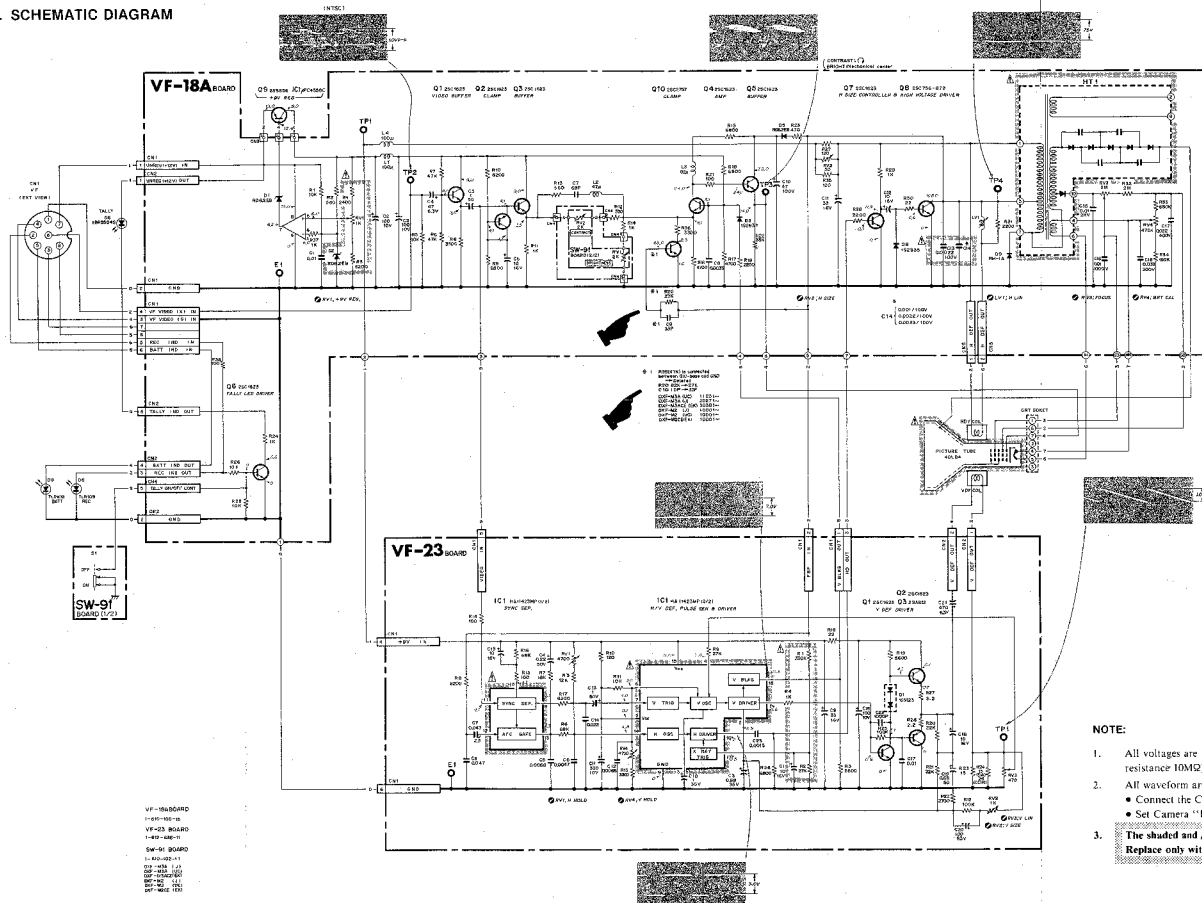


- n=08 → R-ch
- n=09 → B-ch

Out-of-range of AUTO BLACK  
BALANCE  
(Malfunction in the control system)

**Note:** After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.

## 3-3. SCHEMATIC DIAGRAM



#### 4-5-10. GREEN Rotation Adjustment

Note : After this adjustment, check the back focus adjustment in the green channel.

Object : Registration chart

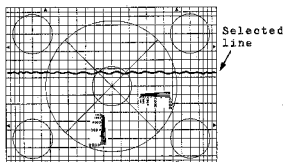
Preparation : Set the tripod adaptor horizontally by using a level, and then mount the camera. Set the registration chart at the horizontal position.

S3 / EN-28A board → "MONI"

S1 / AT-31 board → Mid position

S2 / AT-31 board → Upper position

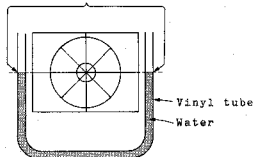
1. Select the lines by using a Waveform monitor and confirm that the horizontal line of the registration chart is in parallel with the selected line on the monitor.



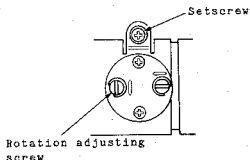
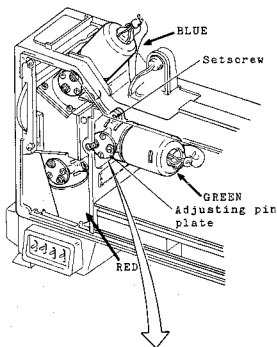
Monitor

The use of a transparent vinyl tube containing water, instead of a level, makes it possible to set the registration chart correctly at the horizontal position.

The horizontal line is adjusted.



2. If these 2 lines are not in parallel, make the following adjustments.
3. Carefully loosen the setscrew shown below:
4. Adjust the positioning screw so that the selected line on the monitor is in parallel with the horizontal line of the registration chart.
5. Carefully tighten the setscrew.



#### 4-5-11. RED Back Focus and Rotation Adjustment

Note : Be sure to carry out 4-5-9. GREEN Back Focus Adjustment, 4-5-10. GREEN Rotation Adjustment.

##### 1. Red Back Focus Adjustment

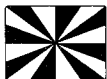
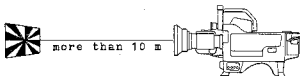
Object : Siemens Star chart

Preparation : S3 / EN-28A board → "MONI"

Lens iris : Open

Adjust :

- 1) S1 / AT-31 board → Mid position  
S2 / AT-31 board → Upper position
- 2) Set the zoom control at TELE so as to obtain the maximum multiplication factor.  
Do not touch the focus control after setting its position in this step during this adjustment.
- 3) S1 / AT-31 board → Upper position
- 4) Set the zoom control at TELE so as to obtain the maximum multiplication factor.  
If the image is not focused, carefully loosen the setscrew shown below and tighten the setscrew after the back focus adjusting screw is set at the optimum focus position.



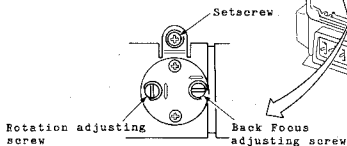
(TELE)



(WIDE)

monitor picture

Note : When the zoom control is set at WIDE, be careful not to be exposed to strong light such as a fluorescent lamp.



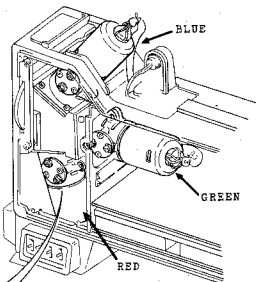
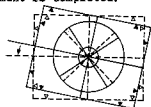
##### 2. Red Rotation Adjustment

Object : Registration chart

Adjust :

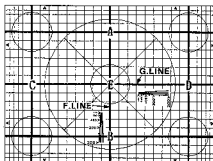
- 1) S1 / AT-31 board → Upper position  
S2 / AT-31 board → Under position
- 2) Check whether 2 horizontal lines at the center of the R and -G picture are in parallel or overlapped.  
If these 2 lines are not in parallel or overlapped, make the following adjustments.
- 3) Carefully loosen the setscrew shown above.  
Adjust the positioning screw so that the horizontal line at the center of the R picture is overlapped or in parallel with the picture in the green channel.
- 4) Carefully tighten the setscrew.

Note : The Red Rotation adjustment exerts influence on the Red Back Focus adjustment, so be sure to check the Red Back Focus adjustment after the Rotation adjustment is completed.



#### 4-5-15. RED Registration Adjustment

Object : Registration chart



#### Preparations :

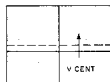
S1/AT-31 board → Upper position  
S2/AT-31 board → Under position

#### Adjust :

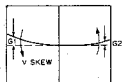
1. Adjust **OR-H CENT** control at the measuring point E on the test chart so that black line (red) of horizontal direction is located on the white line (green) of vertical direction.



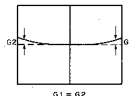
2. Adjust **OR-V CENT** control at the measuring point E on the chart so that black line (red) of horizontal direction is located on the white line (green) of horizontal direction.



3. Adjust **OR-V SKEW** control until the two horizontal lines (white and black) at measuring points C and D on the test chart deviate equally ( $G1=G2$ ).



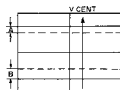
4. Parallel the two horizontal lines (black and white) at measuring point G-line on the test chart by using **OR-V BOW** control.



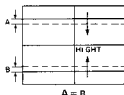
5. Adjusting the **OR-V BOW** control shifts the V centering. **OR-V CENT** control must be adjusted so that the two horizontal lines (white and black) overlap at measuring point G-line on the test chart.



6. Alternately repeat the steps 2 to 5 two or three times so that the black line (red channel) of horizontal direction is located on the white line (green channel) of horizontal direction.
7. Keep an eye on measuring points A and B on the test chart and measure the deviation of the two lines (black and white).
8. Adjust **OR-V CENT** control until the two horizontal lines (white and black) at test chart measuring points A and B deviate equally ( $A=B$ ).

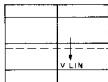


9. Adjust **OR HIGHT** control until the two horizontal lines (black and white) at both measuring points A and B on the test chart overlap.





10. Adjusting **OR HIGHT** control shifts the V centering. **OR-V LIN** control must be adjusted so that the two horizontal lines overlap at measuring point G-lines on the test chart.

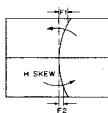


11. Alternately repeat the steps 8 to 10 two or three times so that the two horizontal lines (white and black) overlap at measuring point A, B and E.

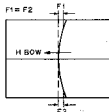
12. Keep an eye at measuring point E on the test chart and adjust **OR-H CENT** control until the two vertical lines (white and black) overlap.



13. Keep an eye at measuring point F-line on the test chart and adjust **OR-H SKEW** control until the two vertical lines (white and black) deviate equally ( $F_1=F_2$ ).



14. Parallel the two vertical lines (black and white) at measuring point F-line on the test chart by using **OR-H BOW** control.



15. Adjusting **OR-H BOW** control shifts the H centering. **OR-H CENT** control must be adjusted so that the two vertical lines (white and black) overlap at measuring point F-line on the test chart.



16. Alternately repeat the steps 1 to 4 two or three times until the two lines (white and black) overlap on the vertical screen center at measuring point F-line).

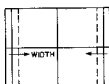
17. Keep an eye on measuring points C and D and measure the deviation of the white and black lines.

18. Adjust **OR-H CENT** until the two vertical lines (white and black) at measuring points C and D on the test chart deviate equally.



19. Adjust **OR WIDTH** until the two vertical lines (white and black) at both measuring points C and D on the test chart overlap.

(O) WIDTH → counter-clockwise



(O) WIDTH → clockwise

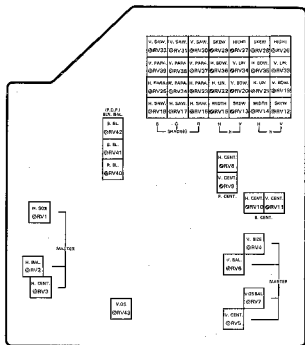


20. Adjusting the  $\odot$ R WIDTH shifts the H centering.

$\odot$ R-H LIN must be adjusted so that the two vertical lines (white and black) other overlap each at measuring point E (screen center).

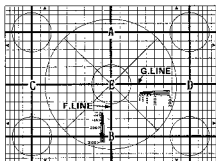


21. Alternate steps 17 to 19 several times until the two vertical lines (white and black) overlap each other at measuring point C, D and E.



#### 4-5-16. BLUE Registration Adjustment

Object : Registration chart



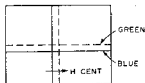
##### Preparations :

S1/AT-31 board → Upper position

S2/AT-31 board → Under position

##### Adjust :

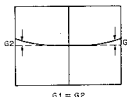
- Adjust **OB-H CENT** control at the measuring point E on the test chart so that black line (blue) of horizontal direction is located on the white line (green) of vertical direction.



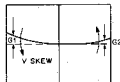
- Adjust **OB-V CENT** control at the measuring point E on the chart so that black line (blue) of horizontal direction is located on the white line (green) of horizontal direction.



- Adjust **OB-V SKEW** control until the two horizontal lines (white and black) at measuring points C and D on the test chart deviate equally ( $G_1 = G_2$ ).



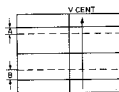
- Parallel the two horizontal lines (black and white) at measuring point G-line on the test chart by using **OB-V BOW** control.



- Adjusting the **OB-V BOW** control shifts the V centering. **OB-V CENT** control must be adjusted so that the two horizontal lines (white and black) overlap at measuring point G-line on the test chart.



- Alternately repeat the steps 2 to 5 two or three times so that the black line (blue channel) of horizontal direction is located on the white line (green channel) of horizontal direction.
- Keep an eye on measuring points A and B on the test chart and measure the deviation of the two lines (black and white).
- Adjust **OB-V CENT** control until the two horizontal lines (white and black) at test chart measuring points A and B deviate equally ( $A=B$ ).



#### 4-7 AUTOMATIC CONTROL SYSTEM

##### 4-7-1. Automatic Iris Control Adjustment

Object : Grayscale chart  
Equipment : Waveform monitor

##### Preparations :

Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture on the monitor.

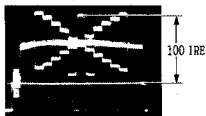
Focus the image using the optical focus control.

Set the S3 on the EN-28A board at OPE position.  
Fully turn the RV1 on the AT-31 board clockwise.

Set the lens AUTO/MANUAL select at AUTO position.

Adjust :

Adjust the white portion of the Grayscale chart at 100IRE using RV2 on the AT-31 board.



##### 4-7-2. Low Light Adjustment

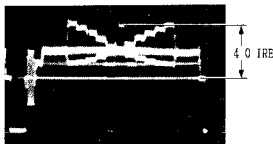
Object : Grayscale chart  
Equipment : Waveform monitor  
Preparation :

Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture on the monitor.

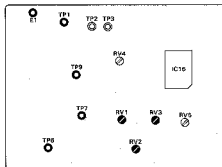
Focus the image using the optical focus control.

Adjust :

1. Set the white portion of the grayscale at 40IRE using iris control.



2. Adjust the RV3 on the AT-31 board so that the character of "LOW LIGHT" is appeared on the viewfinder screen.
  3. Open the iris gradually and make sure that the LOW LIGHT reading disappears from the viewfinder when the white level of the grayscale is 47IRE.
- If it does not disappear, repeat item (2).



AT-31 Board (Component side)

#### 4-7-3. ABL Adjustment

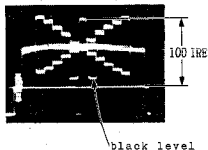
Object : Grayscale chart  
Equipment : Waveform monitor  
Preparation :

Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.

Focus the image using the optical focus control.

Adjust :

1. Adjust the iris control so that the white portion level of the grayscale is 100IRE.
2. Adjust the RV5 on the AT-31 board so that the black portion level of the grayscale does not change when selecting the ABL switch from ON to OFF or vice versa.

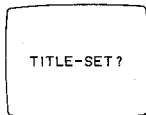


#### 4-7-4. Character Size Adjustment

Equipment : B/W monitor or color monitor  
Preparation : Set the BARS/WB switch to BARS position.

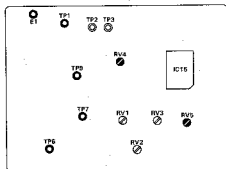
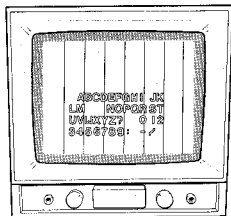
Adjust :

1. When the DISP CHG switch is pressed twice, the following is displayed.



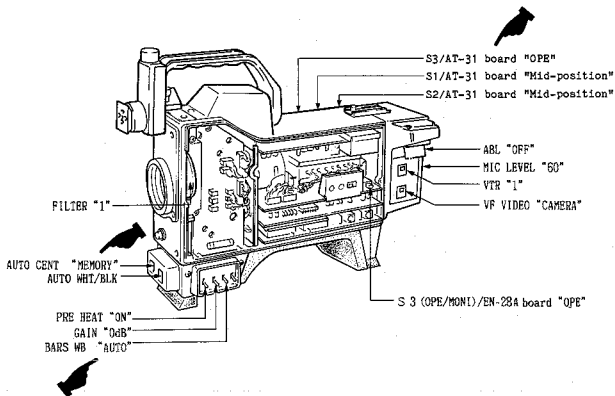
2. Use the AUTO W/E BAL switch to display 12 characters on one line.

Adjust RV4 on the AT-31 board until the end of the 12 characters string touch the boundaries of sixth and seventh color bars.



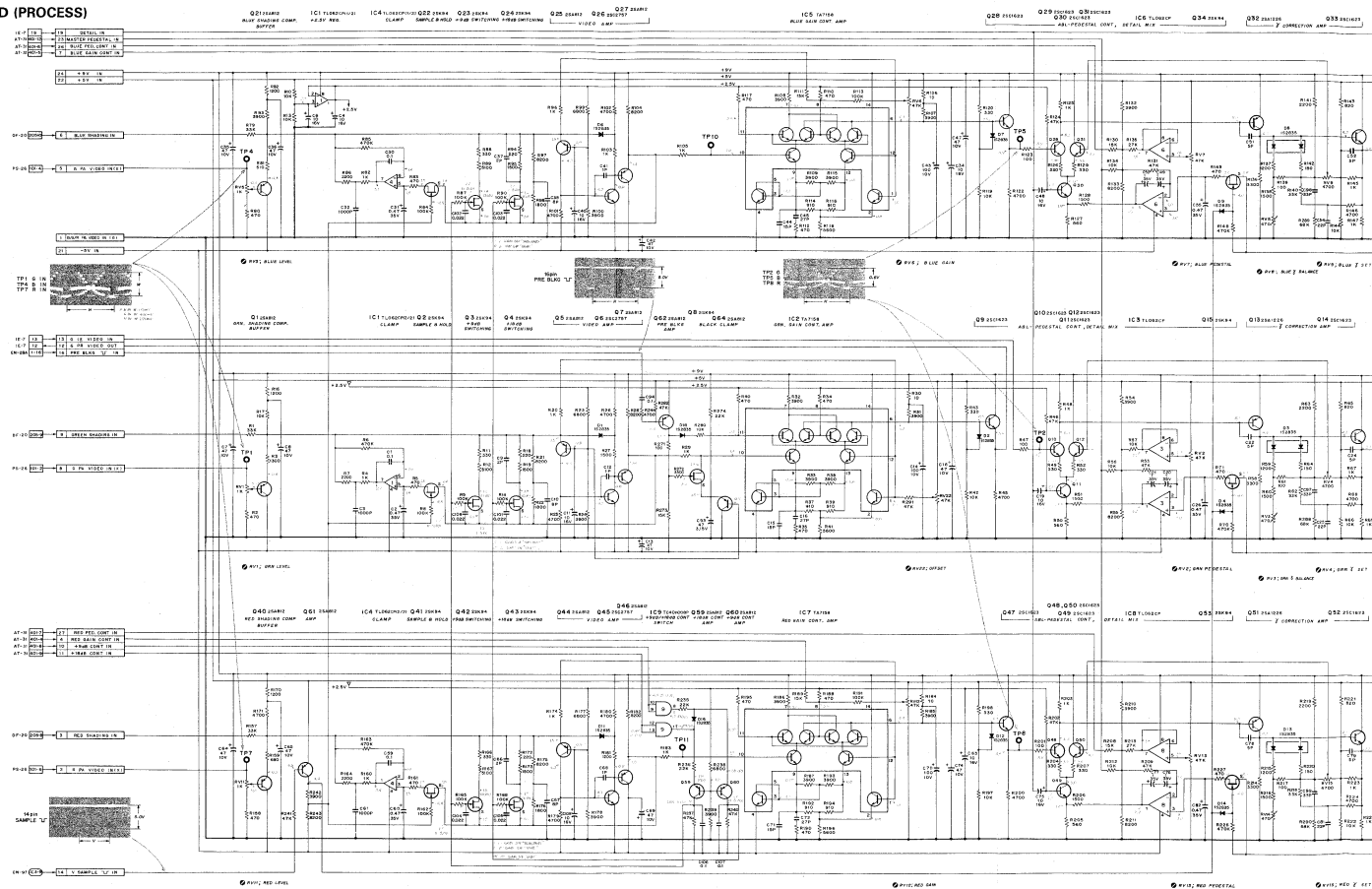
AT-31 Board (Component side)

# Final Switches Setting

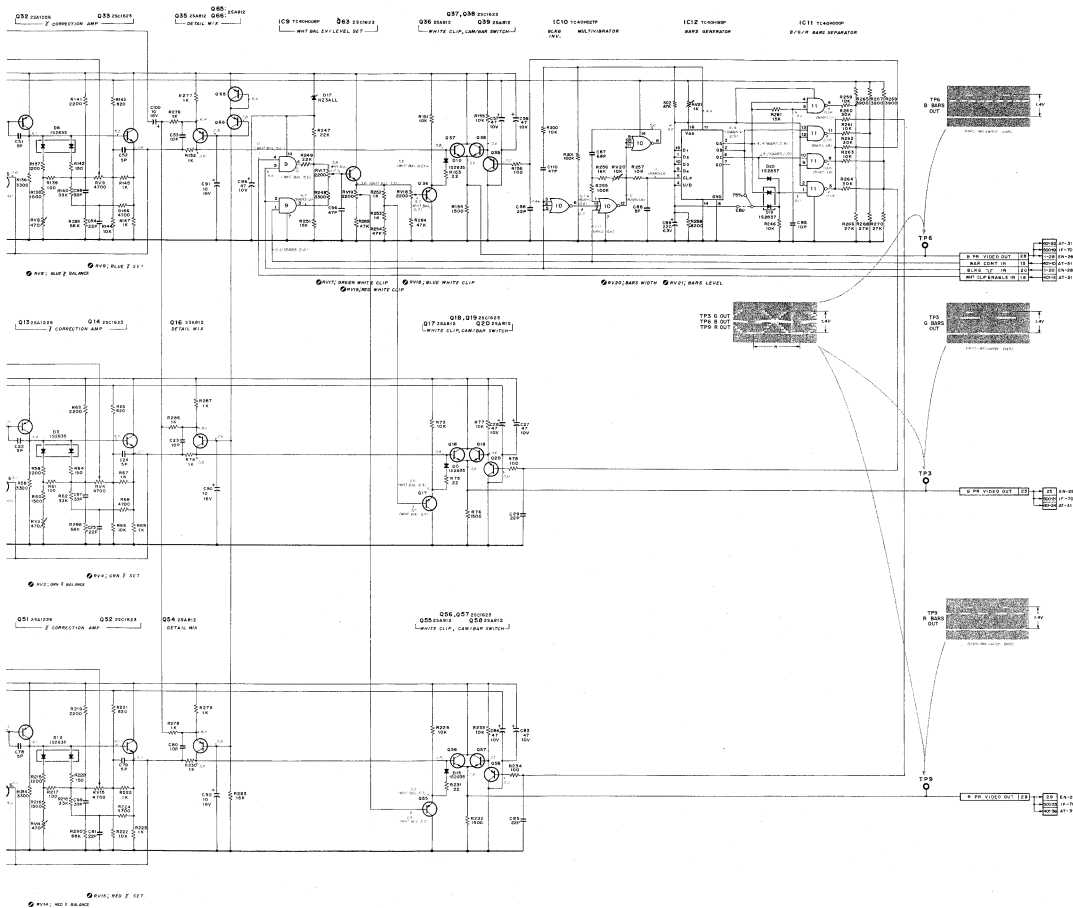




## PR-61 BOARD (PROCESS)







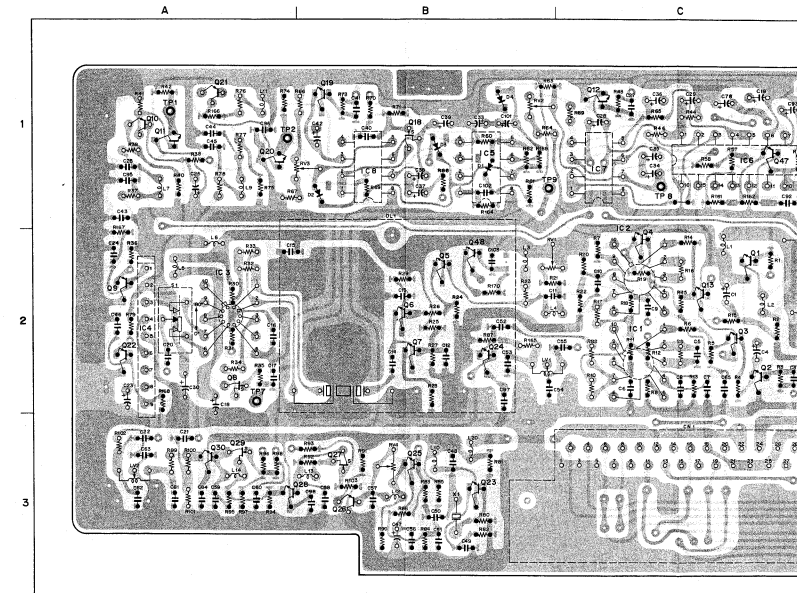
# 注意

1. DC 電圧はデジタル電圧計による値。
2. 波形写真は下記条件で撮影。
  - PR-61 基板、TP1 にてグレースケールの白部分が 400mVp-p になる様レンズアリスをセットする。  
(F=4、波形モニターで 100IRE)。
  - BARS/WB スイッチ=3200°K 位置
  - GAIN スイッチ=0dB 位置
  - フィルターディスク=“1”

# NOTE:

1. All voltage are dc, measured with a digital volt meter (input resistance 10MSΩ).
2. All wave forms are taken in conditions below.
  - Shoot the gray scale pattern on the pattern box.  
Adjust lens iris so that a white level at TP1/PR-61 board is 400 mV. (F=4, White level on the waveform monitor is 100 IRE)
  - Set camera GAIN switch to 0 dB position.
  - Set camera BARS/WB switch to 3200°K position.

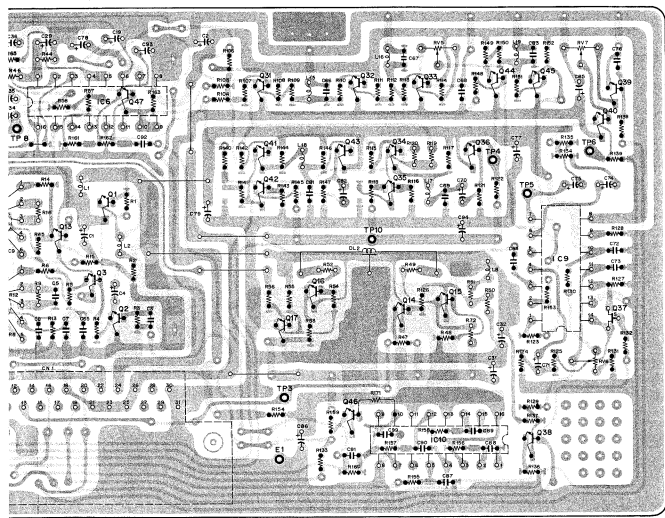
IE-7 BOARD (IMAGE ENHANCER)



TOP VIEW (SCALE 4X)



C D E



—SOLDERING SIDE—  
IE-7 BOARD  
1-1/2" (38.1)  
DIN 15754  
DIN 15754

TOP VIEW (SCALE 4X)



35A487

TOP VIEW (SCALE 4X)



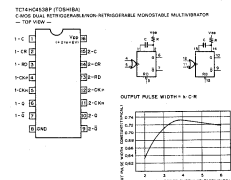
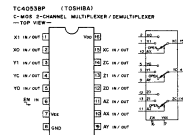
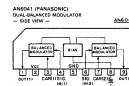
20C3792



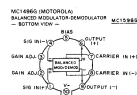
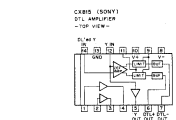
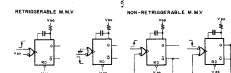
20M



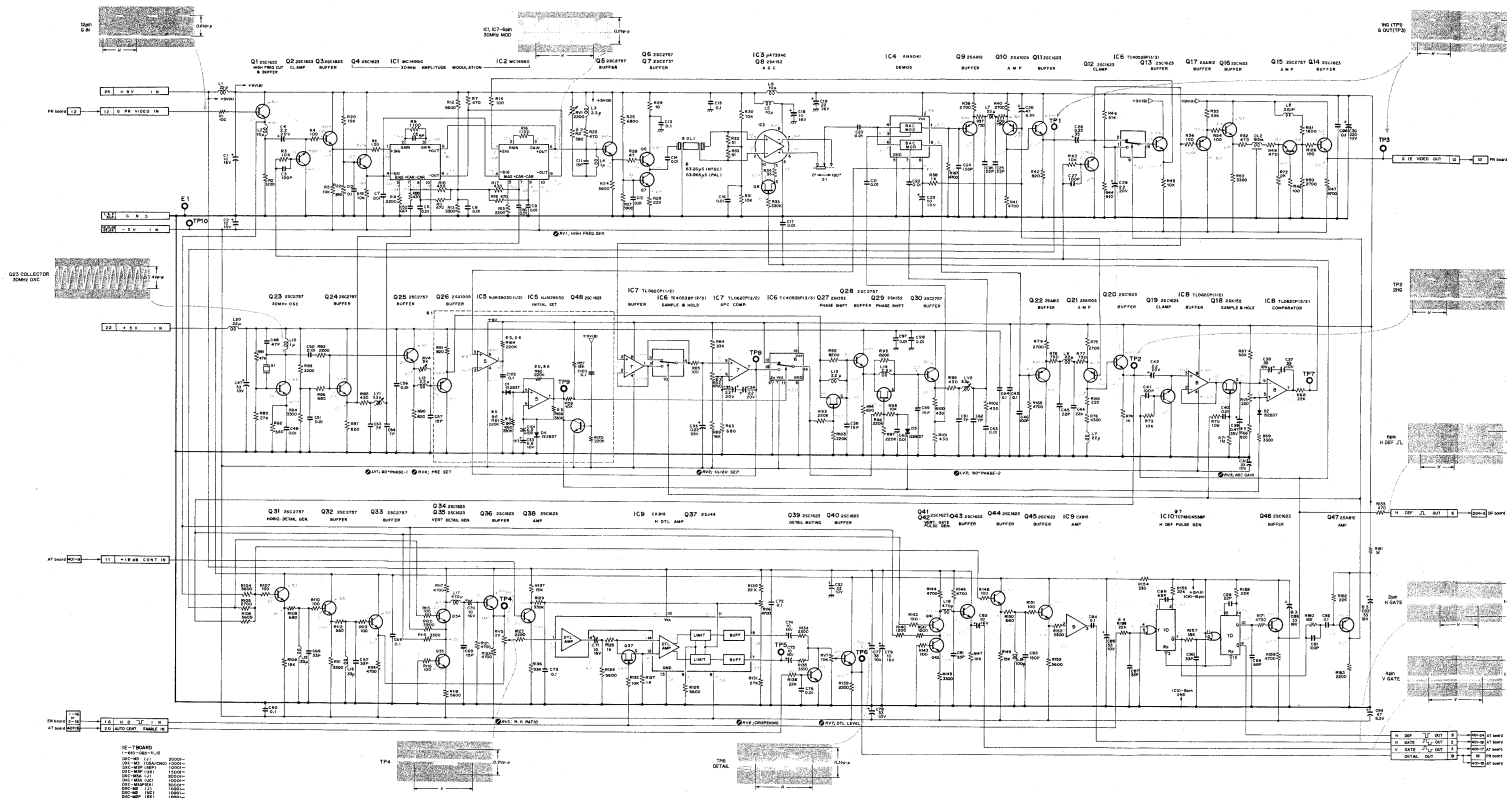
20K187

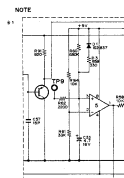
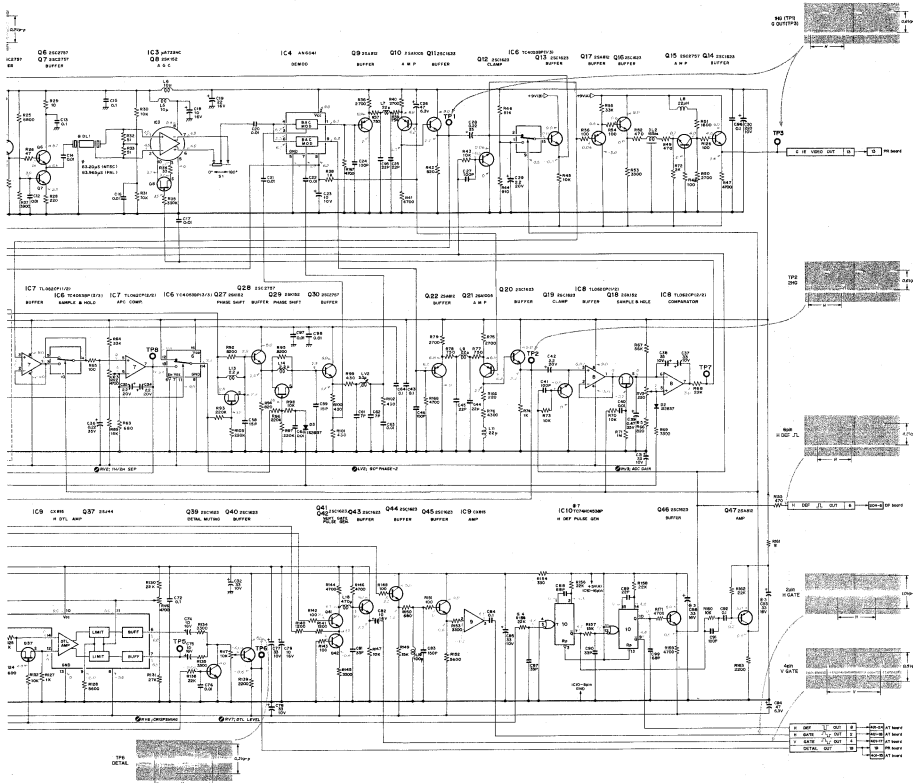


Q1	Q2	Q3	Q4
LOW LEVEL	LOW LEVEL	LOW LEVEL	LOW LEVEL
HIGH LEVEL	HIGH LEVEL	HIGH LEVEL	HIGH LEVEL
DATA	DATA	DATA	DATA



### IE-7 BOARD (IMAGE ENHANCER)





IC	Pin	Signal	Level	Waveform
IC1	1	V <sub>CC</sub>	5V	DC
IC1	2	GND	0V	DC
IC1	3	IN	0V	DC
IC1	4	OUT	0V	DC
IC1	5	V <sub>CC</sub>	5V	DC
IC1	6	GND	0V	DC
IC1	7	IN	0V	DC
IC1	8	OUT	0V	DC
IC1	9	V <sub>CC</sub>	5V	DC
IC1	10	GND	0V	DC
IC1	11	IN	0V	DC
IC1	12	OUT	0V	DC
IC1	13	V <sub>CC</sub>	5V	DC
IC1	14	GND	0V	DC
IC1	15	IN	0V	DC
IC1	16	OUT	0V	DC
IC1	17	V <sub>CC</sub>	5V	DC
IC1	18	GND	0V	DC
IC1	19	IN	0V	DC
IC1	20	OUT	0V	DC
IC1	21	V <sub>CC</sub>	5V	DC
IC1	22	GND	0V	DC
IC1	23	IN	0V	DC
IC1	24	OUT	0V	DC
IC1	25	V <sub>CC</sub>	5V	DC
IC1	26	GND	0V	DC
IC1	27	IN	0V	DC
IC1	28	OUT	0V	DC
IC1	29	V <sub>CC</sub>	5V	DC
IC1	30	GND	0V	DC
IC1	31	IN	0V	DC
IC1	32	OUT	0V	DC
IC1	33	V <sub>CC</sub>	5V	DC
IC1	34	GND	0V	DC
IC1	35	IN	0V	DC
IC1	36	OUT	0V	DC
IC1	37	V <sub>CC</sub>	5V	DC
IC1	38	GND	0V	DC
IC1	39	IN	0V	DC
IC1	40	OUT	0V	DC
IC1	41	V <sub>CC</sub>	5V	DC
IC1	42	GND	0V	DC
IC1	43	IN	0V	DC
IC1	44	OUT	0V	DC
IC1	45	V <sub>CC</sub>	5V	DC
IC1	46	GND	0V	DC
IC1	47	IN	0V	DC
IC1	48	OUT	0V	DC
IC1	49	V <sub>CC</sub>	5V	DC
IC1	50	GND	0V	DC
IC1	51	IN	0V	DC
IC1	52	OUT	0V	DC
IC1	53	V <sub>CC</sub>	5V	DC
IC1	54	GND	0V	DC
IC1	55	IN	0V	DC
IC1	56	OUT	0V	DC
IC1	57	V <sub>CC</sub>	5V	DC
IC1	58	GND	0V	DC
IC1	59	IN	0V	DC
IC1	60	OUT	0V	DC
IC1	61	V <sub>CC</sub>	5V	DC
IC1	62	GND	0V	DC
IC1	63	IN	0V	DC
IC1	64	OUT	0V	DC
IC1	65	V <sub>CC</sub>	5V	DC
IC1	66	GND	0V	DC
IC1	67	IN	0V	DC
IC1	68	OUT	0V	DC
IC1	69	V <sub>CC</sub>	5V	DC
IC1	70	GND	0V	DC
IC1	71	IN	0V	DC
IC1	72	OUT	0V	DC
IC1	73	V <sub>CC</sub>	5V	DC
IC1	74	GND	0V	DC
IC1	75	IN	0V	DC
IC1	76	OUT	0V	DC
IC1	77	V <sub>CC</sub>	5V	DC
IC1	78	GND	0V	DC
IC1	79	IN	0V	DC
IC1	80	OUT	0V	DC
IC1	81	V <sub>CC</sub>	5V	DC
IC1	82	GND	0V	DC
IC1	83	IN	0V	DC
IC1	84	OUT	0V	DC
IC1	85	V <sub>CC</sub>	5V	DC
IC1	86	GND	0V	DC
IC1	87	IN	0V	DC
IC1	88	OUT	0V	DC
IC1	89	V <sub>CC</sub>	5V	DC
IC1	90	GND	0V	DC
IC1	91	IN	0V	DC
IC1	92	OUT	0V	DC
IC1	93	V <sub>CC</sub>	5V	DC
IC1	94	GND	0V	DC
IC1	95	IN	0V	DC
IC1	96	OUT	0V	DC
IC1	97	V <sub>CC</sub>	5V	DC
IC1	98	GND	0V	DC
IC1	99	IN	0V	DC
IC1	100	OUT	0V	DC

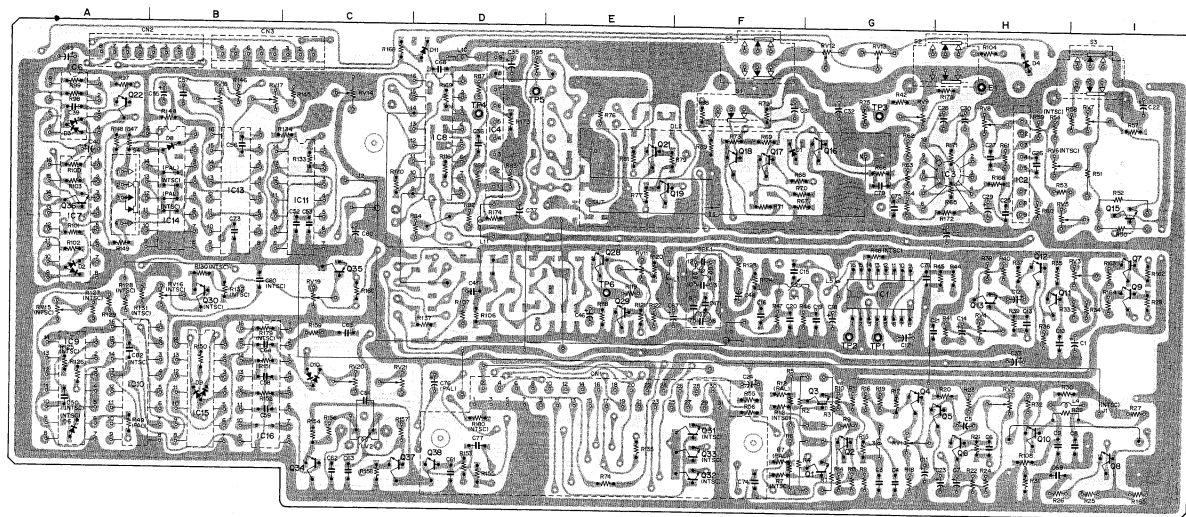
## 注意

- DC 電圧はデジタル電圧計による値。
- 波影写真は下記条件で撮影。
  - ホワイトウィンドーチャートを撮り、PR-61基板のTP1で白レベルが 400mV<sub>p-p</sub>になる様レンズアイリスをセットする (F≒4.0、波影モニターで 100IRE)。
  - GAIN スイッチ→0dB 位置。
  - BARS/WB スイッチ→3200°K 位置。
  - フィルターディスク "1"。

## NOTE:

- All voltage are dc, measured with a digital volt meter (input resistance 10 MΩ).
- All waveforms are taken in conditions below.
  - Shoot the white window pattern on the pattern box. Adjust lens iris so that a white level at TP1/PR-61 board is 400 mv. (F≒4.0, White level on the waveform monitor is 100 IRE)
  - Set camera GAIN switch to 0 dB position.
  - Set camera BARS/WB switch to 3200°K position.

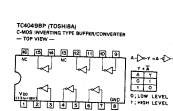
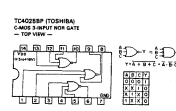
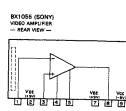
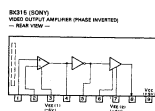
## EN-28A BOARD (ENCODER)

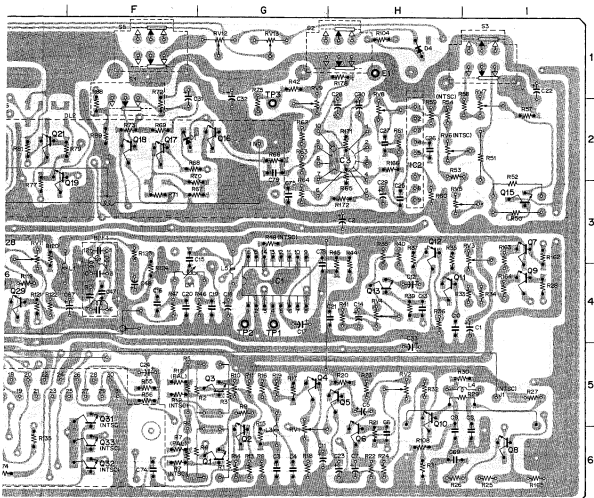


BPF1	F-4	IC1	G-4	Q3	G-5	Q30 (NTSC)	B-4	RV12	G-1	TP4	D-2
CN1	E-5	IC2	H-2	Q4	G-5	Q31 (NTSC)	B-4	RV13	G-1	TP5	D-1
CN2	A-1	IC3	H-2	Q5	H-5	Q32 (NTSC)	F-6	RV14	C-1	TP6	E-4
CN3	B-1	IC4	D-2	Q6	H-6	Q33 (NTSC)	F-6	RV15 (NTSC)	A-4		
		IC5	A-2	Q7	I-3	Q34	C-6	RV16 (NTSC)	B-4		
D1	F-2	IC6	D-2	Q8	I-4	Q35	C-4	RV17	B-1		
D2	A-4	IC7	A-2	Q9	I-6	Q36	C-6	RV18	B-1		
D3	A-2	IC8	A-5	Q10	H-6	Q37	C-6	RV19	C-4		
D4	H-1	IC9	A-5	Q11	H-4	Q38	D-6	RV20	C-5		
D5 (NTSC)	A-6	IC10	D-3	Q12	H-3	RV1	G-6	RV21	C-5		
D6	B-2	IC11	B-3	Q13	H-4	RV2	H-5	S1	F-2		
D7	B-2	IC12	B-3	Q14	I-3	RV3	I-3	S2	H-1		
D8	B-5	IC13	B-5	Q15	G-2	RV4	H-4	S3	I-1		
D9	C-5	IC14	B-5	Q16	F-2	RV5	I-3	S4	A-3		
D10	D-1	IC15	C-5	Q17	E-2	RV6 (NTSC)	I-2	S5	F-1		
D11		IC16	C-5	Q18	A-2	RV7	I-2	TP1	G-4		
DL2	F-2	LV1	F-4	Q19	E-2	RV8	H-2	TP2	G-4		
E1	H-1	Q1	G-6	Q20	E-3	RV9	G-2	TP3	G-2		
		Q2	G-6	Q21	E-4	RV10	E-3				
				Q22		RV11					
				Q23							

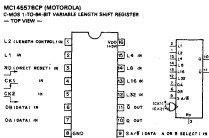
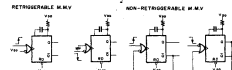
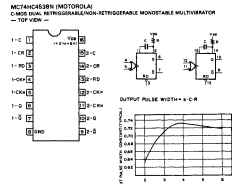
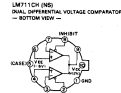
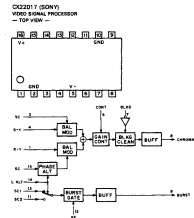
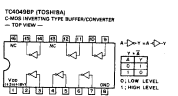
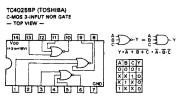
—SOLDERING SIDE—

**EN-28A BOARD**  
 1-812-840-1  
 DEC-MAR 1981  
 DEC-MSAP (EN)



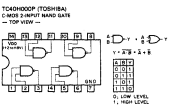
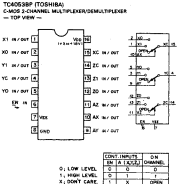


-SOLDERING SIDE-  
**EN-28A BOARD**  
1-14-82-000-11  
DRC: MSA (1/2/2)  
DRC: SEM (1/2)

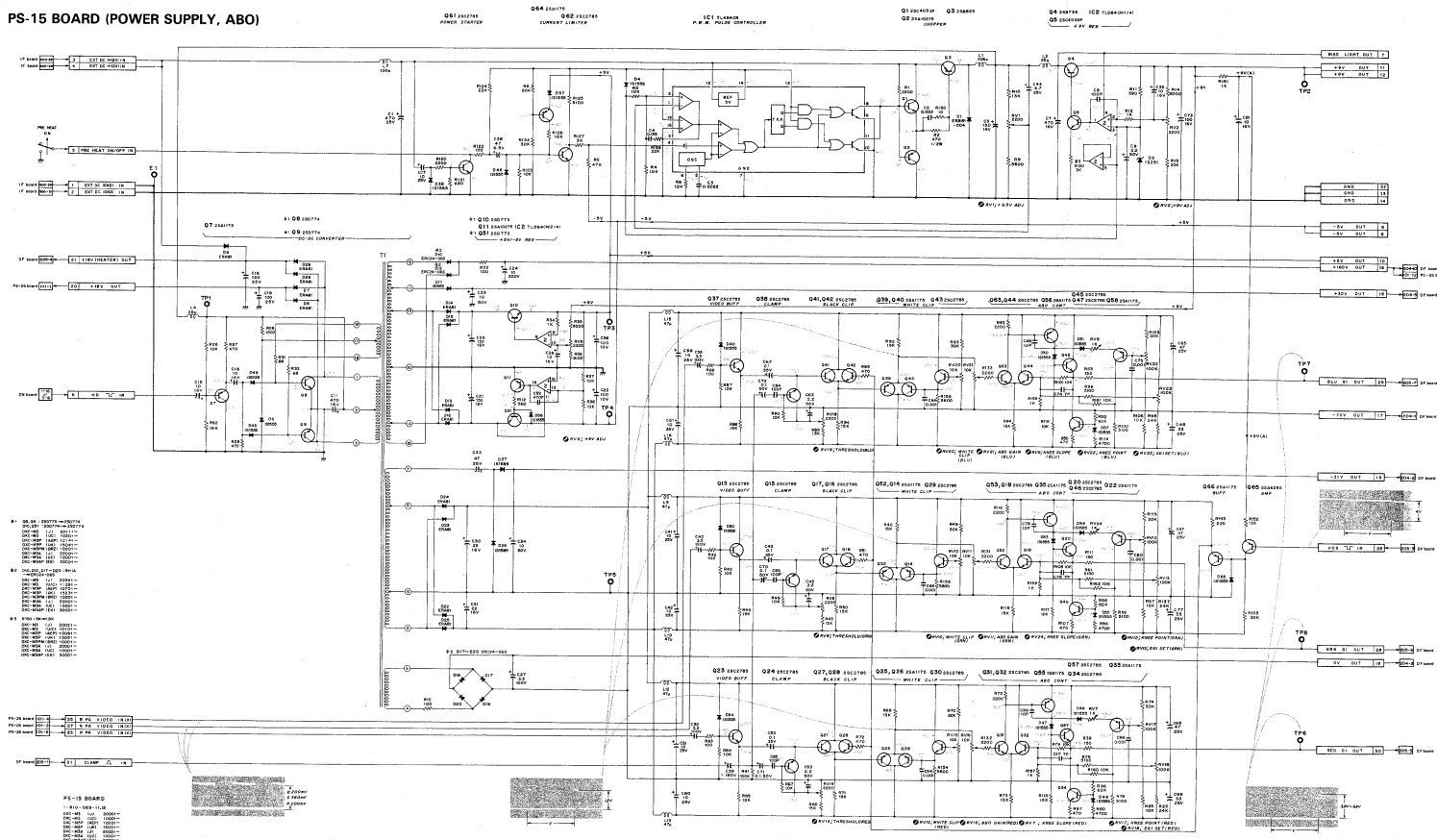


LENGTH SELECT TRUTH TABLE

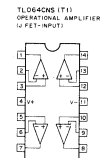
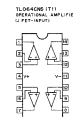
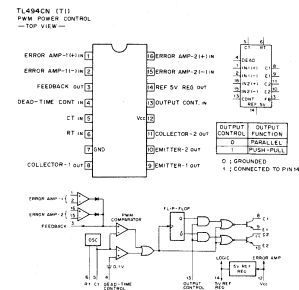
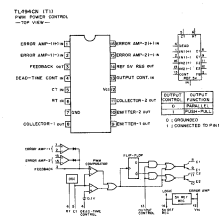
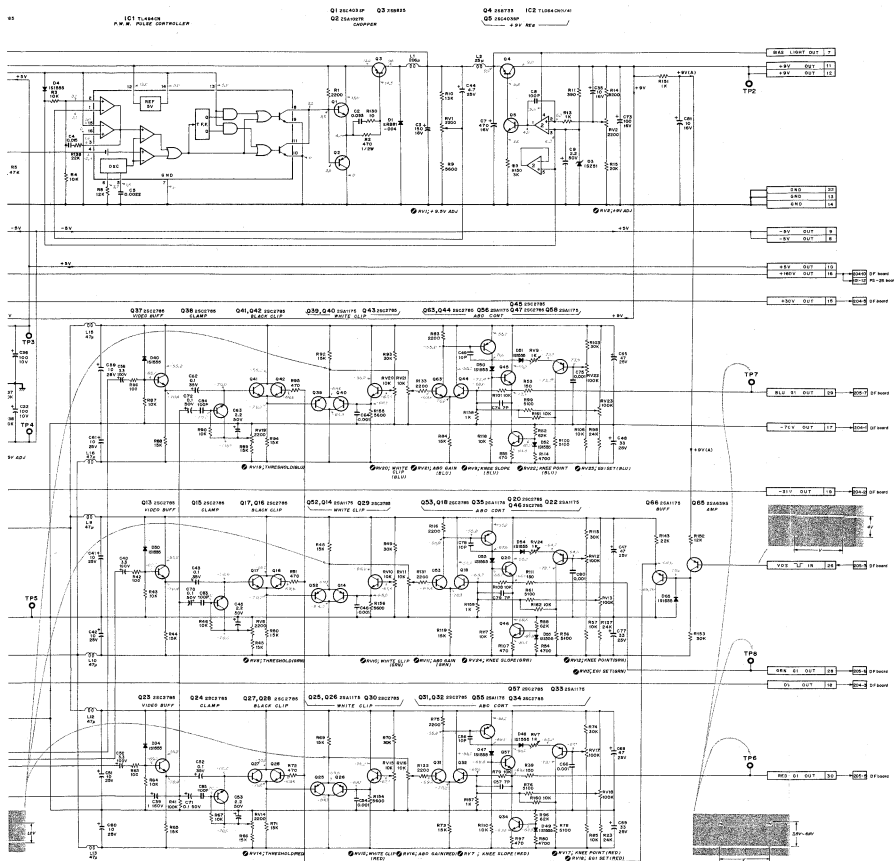
LENGTH SELECT	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0
000	0	0	0	0	0	0	0	0
001	0	0	0	0	0	0	0	1
010	0	0	0	0	0	0	1	0
011	0	0	0	0	0	1	0	0
100	0	0	0	0	1	0	0	0
101	0	0	0	1	0	0	0	0
110	0	0	1	0	0	0	0	0
111	0	1	0	0	0	0	0	0



**PS-15 BOARD (POWER SUPPLY, ABO)**







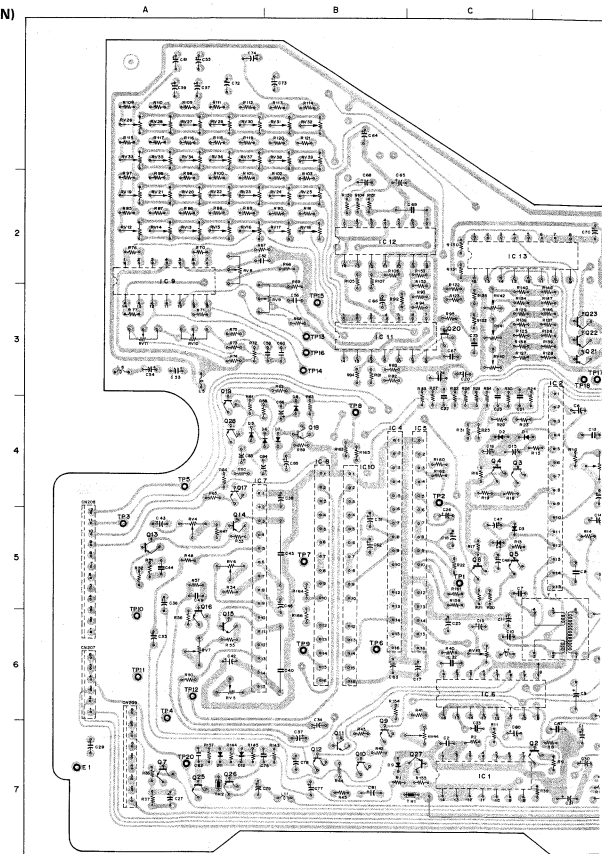
### 注意

- DC 電圧はデジタル電圧計による値。
- 波彩写真は下記条件で撮る。
  - ホワイトウィンドーチャートを撮る 2/3 程度で撮る。この時 PR-61 基板の TPI で白レベルが 400mVpp になる様にレンズアイリスをセットする。(F#4、波彩センサーで 100IRE)。
  - GAIN スイッチ→0dB 位置。
  - BARS/WB スイッチ→3200°K 位置。
  - フィルターディスク→1°。

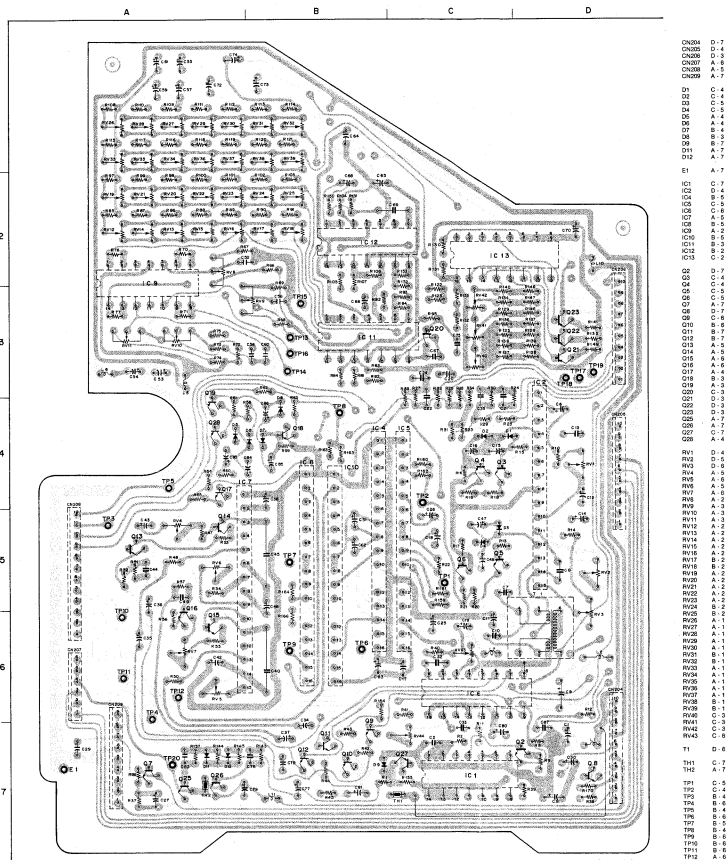
### NOTE:

- All voltage are dc, measured with a digital volt meter. (input resistance 10 MΩ).
- All waveforms are taken in condition below.
  - Shoot the white window pattern where a white portion is about 2/3 on the picture frame. Adjust lens iris so that a white level at TPI/PR-61 board is 400 mV. (F#4, White level on the waveform monitor is 100 IRE).
  - Set camera GAIN switch to 0 dB position.
  - Set camera BARS/WB switch to 3200°K position.

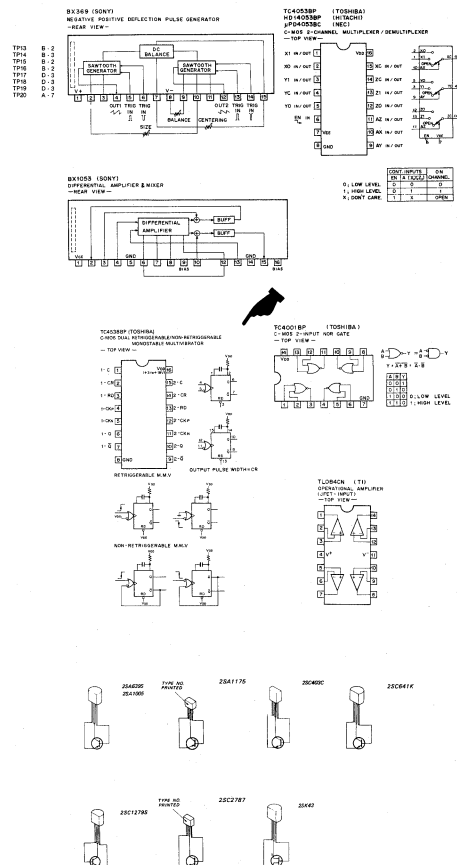
### DF-20 BOARD (DEFLECTION)

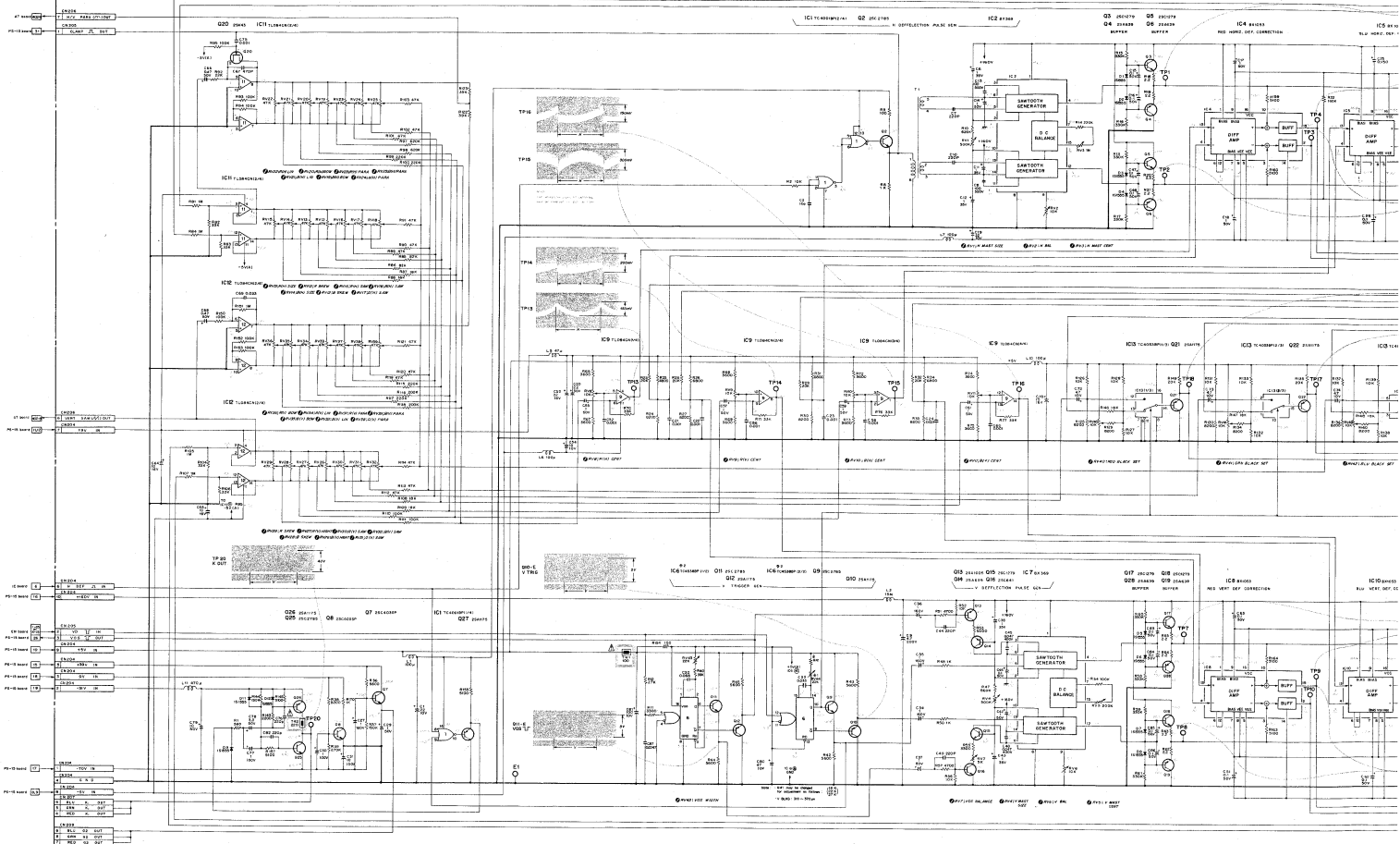


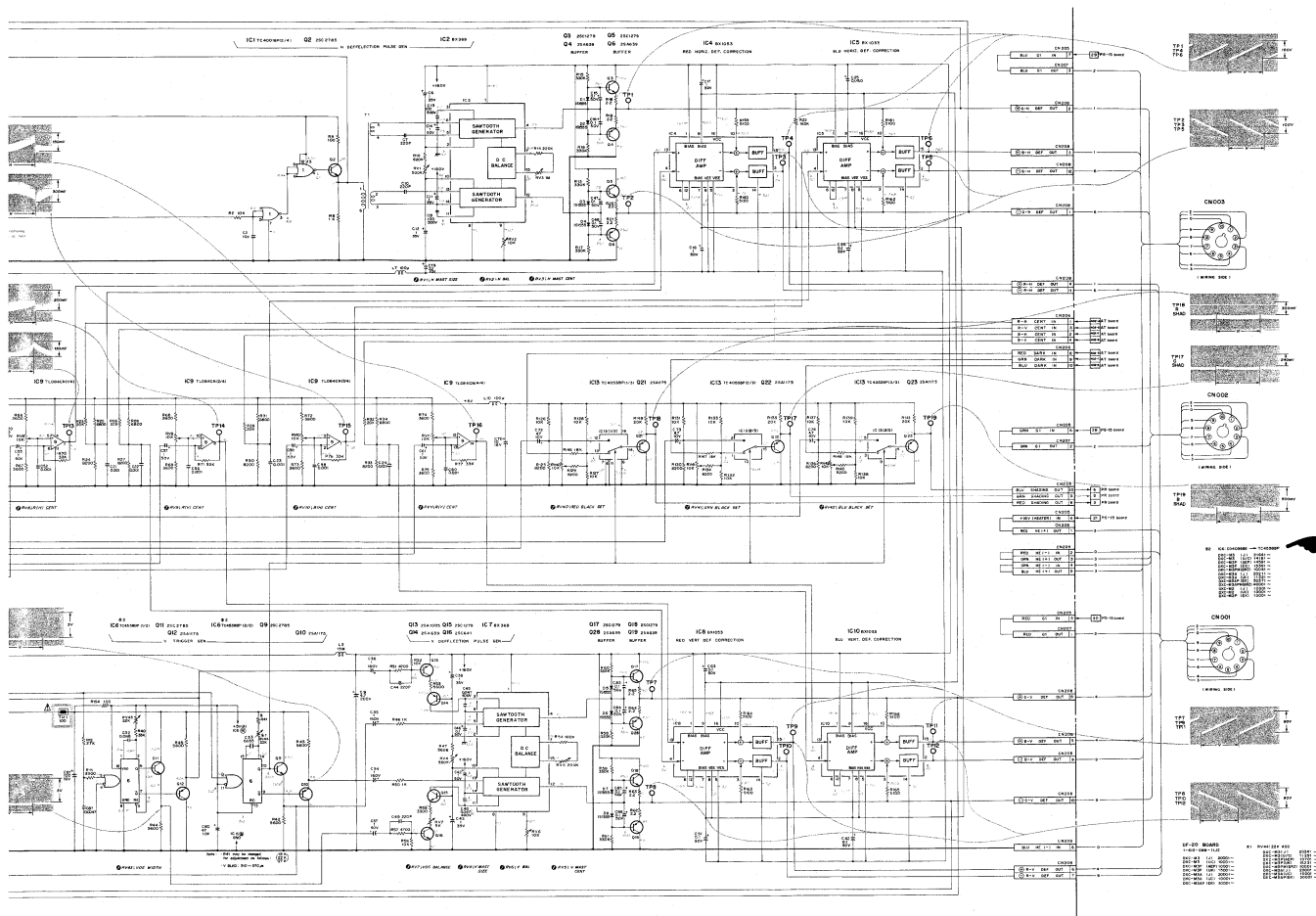
### DF-20 BOARD (DEFLECTION)



—SOLDERING SIDE—  
**DF-20** BOARD  
1-800-438-3636  
3401-8034 1-800-21  
3401-8034 1-800-21







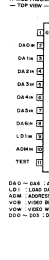
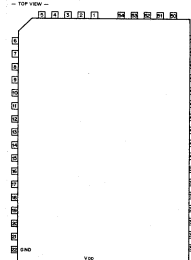
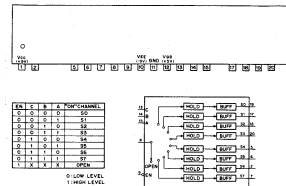
## 注意

1. DC 電圧はデジタル電圧計による値。
2. 波影写真は下記条件で撮影。  
● ホワイトウィンドーチャートを撮り、PR-61基板、TP-1の白ピークレベルが400mVppになる様レンズアイリスをセットする (F=4)。
3. ①印及び②で囲まれた部品は安全性を維持するために重要な部品です。従って交換する時は必ず指定の部品を使って下さい。

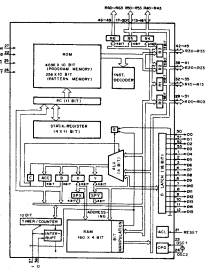
## NOTE:

1. All voltage are dc, measured with a digital volt meter (input resistance 10 M $\Omega$ ).
2. All waveforms are taken in condition below.  
● Shoot the white window pattern where a white is about 2/3 H size on the picture frame.  
Adjust lens iris so that a white level at TP-1/PR-61 board is 400 mV (F=4).  
● Set camera GAIN switch to the OdB position.  
● Set camera BARS WB switch to the 3200°K position.
3. The shaded and  $\Delta$ -marked components are critical to safety. Replace only with same components as specified.

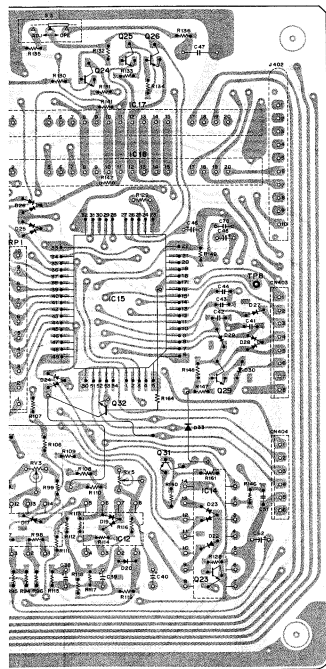
A	B	C	D
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— SOLDERING SIDE —  
**AT-31 BOARD**  
1-612-835-11  
OXC-M36 (VAC)†  
OXC-M32AP (EXT)



D



CN401 B-3  
CN402 D-3  
CN404 D-3

D1 B-2  
D2 B-3  
D3 A-2  
D4 A-2  
D6 A-2  
D7 A-1  
D8 A-4  
D9 A-4  
D10 A-4  
D12 B-3  
D13 B-3  
D14 C-3  
D17 C-4  
D18 B-4  
D19 D-4  
D20 D-4  
D21 B-3  
D22 D-4  
D23 D-4  
D24 C-3  
D25 C-2  
D26 C-2  
D27 D-2  
D28 D-3  
D29 C-2  
D31 C-2  
D32 C-3  
D33 D-3

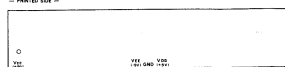
E1 A-1

J402 D-1

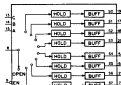
Q1 B-2  
Q2 A-2  
Q3 A-2  
Q4 A-2  
Q5 B-2  
Q6 A-1  
Q7 A-1  
Q8 A-1  
Q9 B-1  
Q10 B-1  
Q11 B-1  
Q12 B-1  
Q13 B-1  
Q14 B-1  
Q15 B-1  
Q16 A-3  
Q17 B-4  
Q18 A-2  
Q19 A-2  
Q20 A-2  
Q21 A-2  
Q22 A-2

Q23 D-4  
Q24 D-1  
Q25 D-1  
Q26 D-1  
Q27 B-2  
Q28 B-2  
Q29 D-3  
Q30 D-3  
Q31 D-3  
Q32 D-3  
Q33 C-2  
Q34 C-4  
Q35 C-4  
Q36 C-2  
Q37 C-2  
Q38 C-4  
Q39 C-2  
Q40 C-2  
Q41 A-1  
Q42 A-2  
Q43 C-1  
Q44 B-1  
Q45 B-1  
Q46 A-3  
Q47 A-3  
Q48 A-3  
Q49 B-3  
Q50 D-2  
Q51 D-2  
Q52 D-2  
Q53 D-2  
Q54 D-2  
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Q56 D-2  
Q57 D-2  
Q58 D-2  
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Q99 D-2  
Q100 D-2

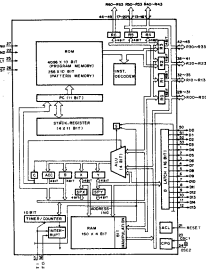
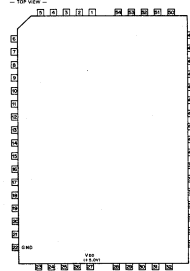
801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



SELECTABLE CHANNEL	SELECTABLE CHANNEL
1	2
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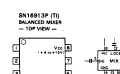
80488000 (INTACH) FLAT PACKAGE  
VIDEO PROGRAMMABLE TV DISPLAY CONTROLLER  
TOP VIEW -



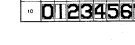
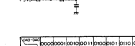
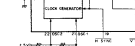
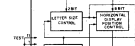
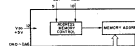
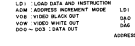
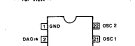
801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



SELECTABLE CHANNEL	SELECTABLE CHANNEL
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801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



SELECTABLE CHANNEL	SELECTABLE CHANNEL
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801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



SELECTABLE CHANNEL	SELECTABLE CHANNEL
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801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



SELECTABLE CHANNEL	SELECTABLE CHANNEL
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99	100



801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -



801176 (SONY)  
CHANNEL SELECTABLE SAMPLING HOLDER  
PRINTED SIDE -

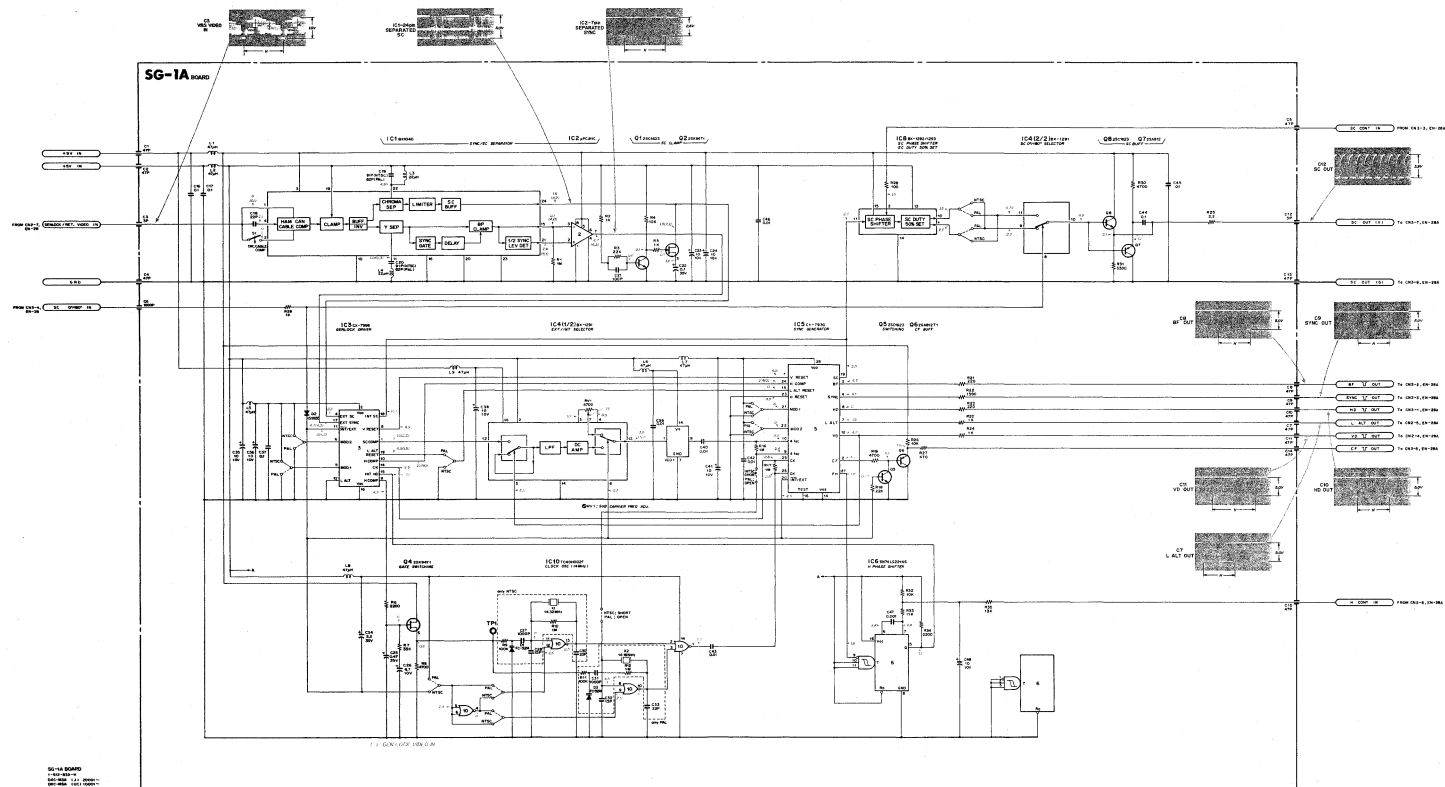


SELECTABLE CHANNEL	SELECTABLE CHANNEL
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67	68
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801176 (SONY)  
CHANNEL SELECTABLE SAM

## SG-1A BOARD (SYNC GENERATOR)



## 注意

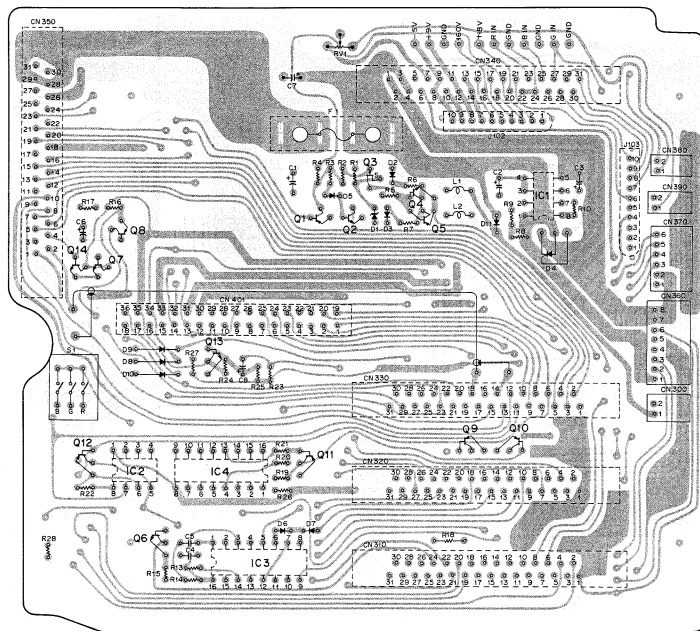
1. DC 電圧はデジタル電圧計による値。
2. 波形状写真は GENLOCK IN 端子よりカラーバー信号を入力する。

## NOTE

1. All voltage are dc, measured with a digital volt meter (input resistance 10 MO).
2. All waveforms are taken in condition below.
  - Supply a color-bar signal to the GEN LOCK terminal.



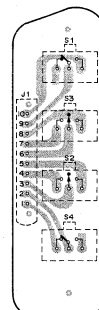
MAIN FRAME  
CN-97 BOARD  
SW-99 BOARD  
SW-70 BOARD



—SOLDERING SIDE—

**CN-97 BOARD**

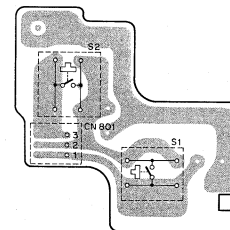
1~812~841-11,12  
DXC-M3A (UC,J)



—SOLDERING SIDE—

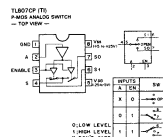
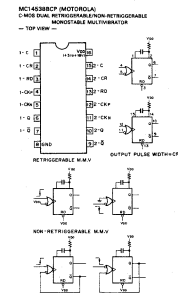
**SW-99 BOARD**

1~812~841-12  
DXC-M3A (UC,J)  
DXC-M3AP (EX)

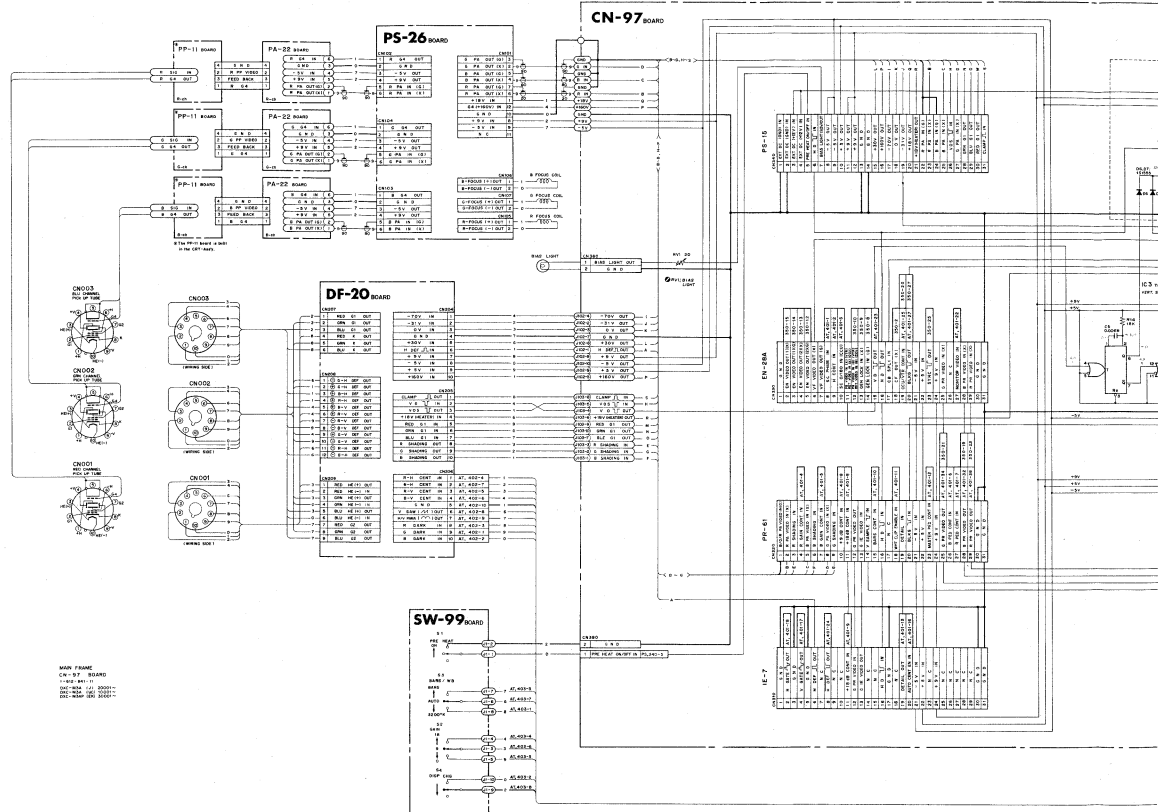


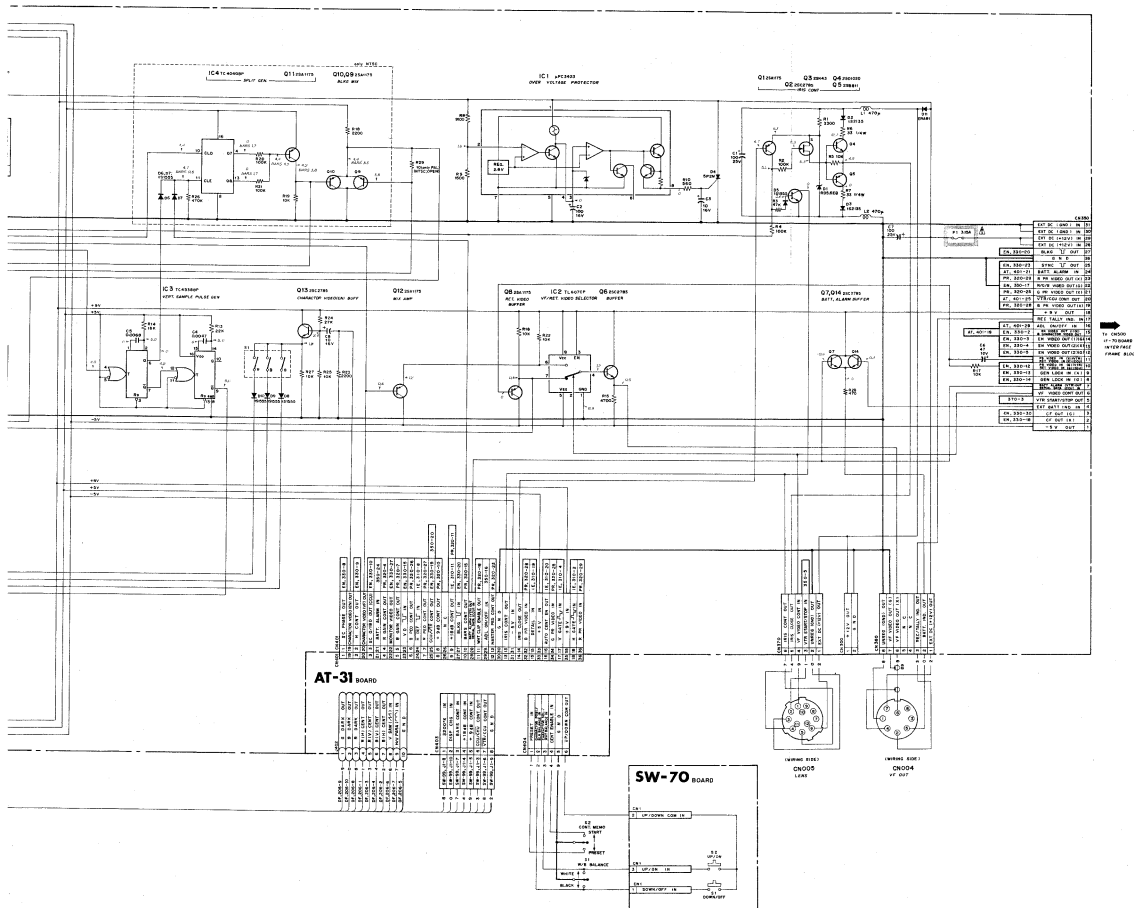
**SW-70 BOARD**

1~812~842-11  
DXC-M3A (UC,J)  
DXC-M3AP (EX)





MAIN FRAME  
CN-97 BOARD  
SW-99 BOARD  
SW-70 BOARD






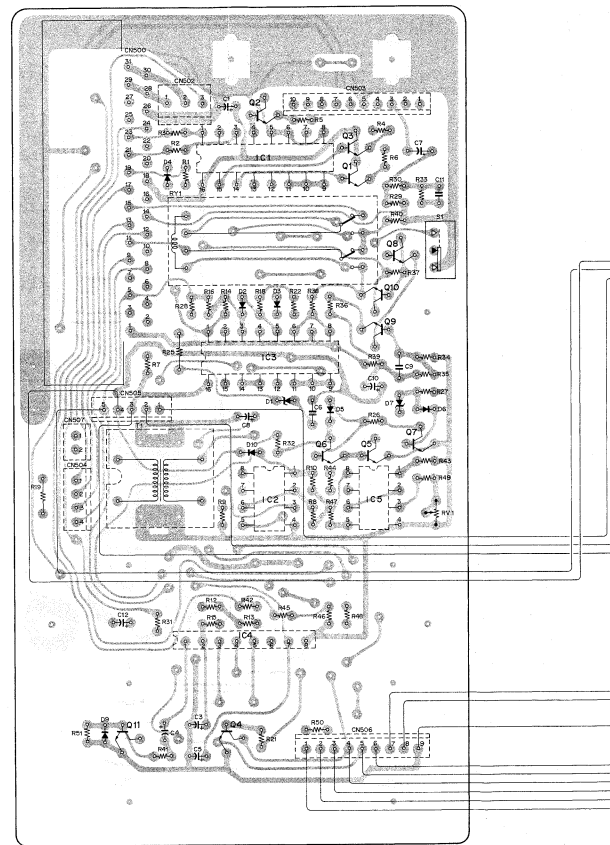
注意：

1. DC 電圧は下記条件による値。  
●VTR/CCU コネクターにカメラアダプター CMA-7 を接続。  
●デジタル電圧計で測定。
2.  印及び  で囲まれた部品は安全性を維持するために重要な部品です。従って交換する時は必ず指定の部品を使って下さい。

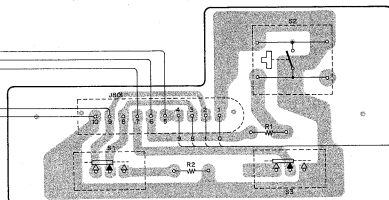
**NOTE:**

1. All voltage are taken in condition below.
  - Digital voltmeter.
  - Power supply: used CMA-7.
2. The shaded and -marked components are critical to safety.  
Replace only with same components as specified.

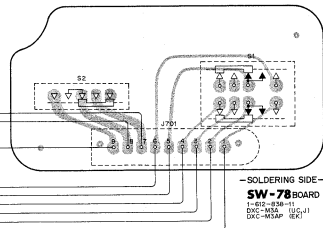
INTERFACE FRAME  
IF-70 BOARD  
AA-5 BOARD  
SW-58 BOARD  
SW-78 BOARD



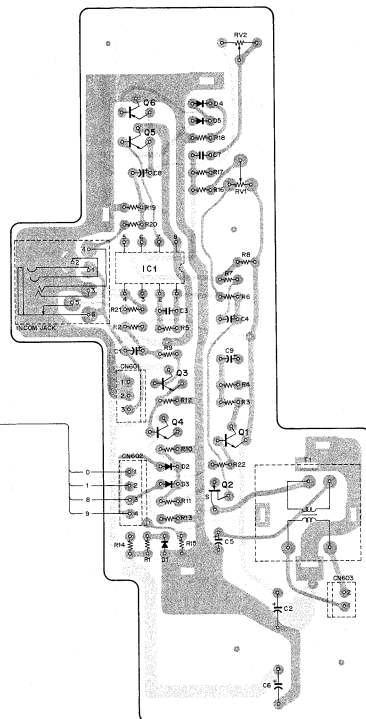
-SOLDERING SIDE-  
IF-70 BOARD  
REV. 10-71  
DEC. 1971  
155-17



—SOLDERING SIDE—  
**SW-58 BOARD**  
1-802-853-11  
ENC-M52 (LOC.)  
ENC-M53P (EXT.)



—SOLDERING SIDE—  
**SW-78 BOARD**  
1-802-853-11  
ENC-M52 (LOC.)  
ENC-M53P (EXT.)



—SOLDERING SIDE—  
**AA-5 BOARD**  
1-802-853-11,12  
ENC-M52 (LOC.)  
ENC-M53P (EXT.)



22M170



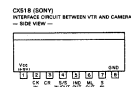
25C74M



25C76B



25C76M



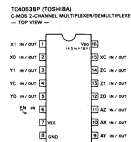
CS18 (809V)  
INTERFACE CIRCUIT BETWEEN VTR AND CAMERA  
—SIDE VIEW—



NUM20030-D LAMP  
OPERATIONAL AMPHIFIER  
—TOP VIEW—



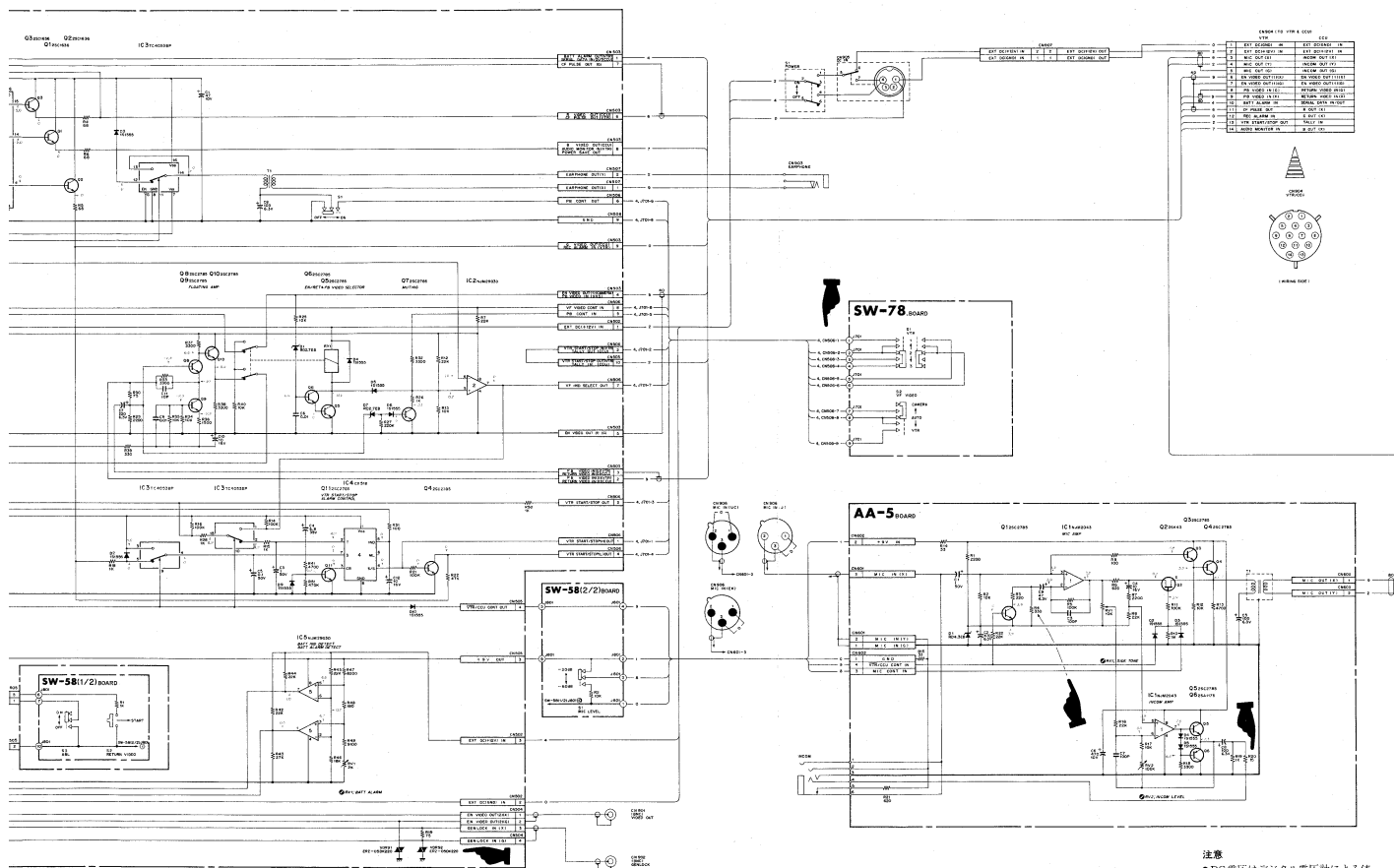
NUM20030-D LAMP  
OPERATIONAL AMPHIFIER  
—TOP VIEW—



TDA2038P (TOSHIBA)  
4-CHANNEL MULTIFUNCTIONAL AMPLIFIER  
—TOP VIEW—

LOW LEVEL	HIGH LEVEL	SW
1	2	3
4	5	6
7	8	9
10	11	12





注意  
●DC 電圧はデジタル電圧計による。

NOTE:  
All voltage are dc, measured with a digital volt meter (input resistance 10 MΩ).

# DXC-M3A/AP

## SUPPLEMENT-2

### SUBJECT

Explanation of self-diagnostic function





(BLOCK DIAGRAM)

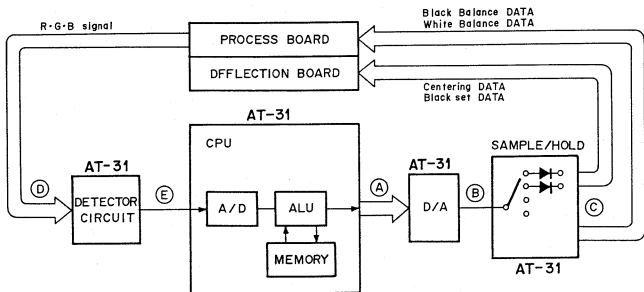


FIG-1

In the auto circuit check, we will diagnose defects related to the auto mode. The auto circuit consists of the micro processor and micro processor interface. Defects are found almost exclusively in the interface rather than micro processor. To check the auto circuit, view finder indication which is diagnosis display to be indicated the defects area.

# 1. Auto Centering "CENT: NG" indication

## STEP-1

View-finder Screen	Meanings	take action
<div style="border: 1px solid black; padding: 10px; width: fit-content;">           CENT: NG            : OBJECT?                  n            TRY AGAIN         </div>	<p>Meanings of indications:</p> <p>.n=00 → The number of horizontal gate pulses are 255 or less in one horizontal time period.</p> <p>.n=01 → The number of vertical gate pulses are 15 or less in one vertical time period.</p> <p>.n=02 → The number of cross-points in the signal waveform are two or more while the multiburst chart is taken.</p> <p>.n=10 → B-H CENT: NG</p> <p>.n=11 → B-V CENT: NG</p> <p>.n=12 → B-H CENT: NG</p> <p>.n=15 → B-H CENT: NG</p> <p>i) Even if the control data are changed, the error voltage of R-G or B-G does not change.</p> <p>ex.</p> <p>ii) The error is out-of-range of the auto-centering control.</p> <p>iii) A highly saturated color in the object at which aim is being.</p> <p>Note: If the number of horizontal gate pulses are 255 or less and the number of vertical gate pulses are 15 or less, the indication is n=01.</p>	<p>1. Adjust Centering using following chart.</p> <div style="text-align: center;"> </div> <p>2. If centering is not adjusted, readjust registration.</p> <p>3. Go to Step-2 (CIRCUIT NG)</p>

# STEP-2

View-finder Screen	Meanings	take action
<p>Preparation:</p> <p>TP8/AT-31 is grounded by jumper wire 50 that AT-31 become self-diagnosis mode.</p> <div data-bbox="132 575 311 704"> <p>CENT: NG : OBJECT? n TRY AGAIN</p> </div>	<p>.n=00 → The error voltage of R-G or B-G is less than 1 and then the control data bit is shifted by +1 or -1 depending on the error voltage polarity, but the polarity of the error voltage is not inverted. ex.</p> <p>.n=01 → The gate pulse counter always overflows. (Normally this counter is reset after it counts 16 gate pulses. In this condition it does not reset.) ex.</p> <p>Note: After completing this check, remove the jumper wire connection TP8/AT-31 board to E1/AT-31 board.</p>	<p>→ check circuit between D and E on Fig-1 (page-1)</p> <p>→ replace IC9 on AT-31.</p>

## 2. Auto White "WHT: NG" indication

### STEP-1

View-finder Screen	Meanings	take action
<div>WHT: NG : LOW LIGHT TRY AGAIN</div>	The auto-white balance operation under LOW LIGHT conditions.	<ol style="list-style-type: none"> <li>1. open the IRIS on Lens.</li> <li>2. set gain up 9 or 18 dB.</li> </ol>
<div>WHT: NG : C. TEMP. LOW CHG. FILTER TRY AGAIN</div> <div>WHT: NG : C. TEMP. HI CHG. FILTER TRY AGAIN</div>	The control data do not settle down to a value between 00 and FF even though the error voltage of R-G or B-G changes with a deviation in the control voltage.	<ol style="list-style-type: none"> <li>1. change FILTER.</li> <li>2. readjust process board.</li> <li>3. go to step-2.</li> </ol>

# STEP-2

View-finder Screen	Meanings	take action
<p>Preparation:</p> <p>TP8/AT-31 is grounded by jumper wire so that AT-31 become soft-diagnosis mode.</p> <div data-bbox="132 564 309 695" style="border: 1px solid black; padding: 5px; margin-top: 20px;"> WHT: NG  : CIRCUIT NG?  DET n  TRY AGAIN </div>	<p>.n=00 → R gain control system</p> <p>.n=01 → B gain control system</p> <p>Effect: The polarity of the error voltage of R-G or B-G is not inverted even though the control data is shifted by +1 or -1 when the error voltage is within <u>+ 1 bit</u>.</p> <p>ex. The sample and hold circuit does not work and the error voltage of R-G or of B-G is always 0V.</p> <p>Note: After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>	<p>→ check circuit between D and E on Fig-1 (page-1)</p>
<div data-bbox="132 875 309 1006" style="border: 1px solid black; padding: 5px; margin-top: 20px;"> WHT: NG  : CIRCUIT NG?  CTL n  TRY AGAIN </div>	<p>.n=00 → R gain control system</p> <p>.n=01 → B gain control system</p> <p>Effect: The error voltage of R-G or B-G does not change even though the control voltage is changed when the error voltage is not within <u>+1 bit</u>.</p> <p>ex. Malfunction in the R-ch or B-ch gain control system.</p> <p>Note: After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>	<p>→ check circuit between A and C on Fig-1 (page-1)</p>

### 3. Auto Black "BLK: NG" Indication

#### STEP-1

View-finder Screen	Meanings	take action
<div>           BLK: NG            : LENS CLOSE?            TRY AGAIN         </div>	The video level on G-ch does not fall.	.The lense connector is disconnected. .The iris close mechanism for the lense does not work.

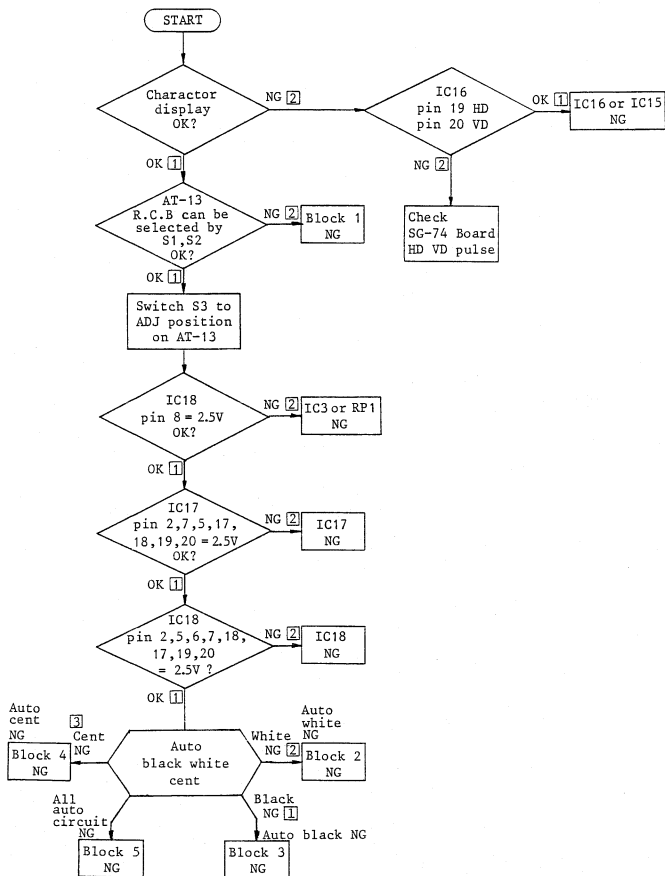
#### STEP-2

View-finder Screen	Meanings	take action
Preparation: TP8/AT-31 is grounded by jumper wire so that AT-31 become soft- diagnosis mode  <div>           BLK: NG            : CIRCUIT NG?            DET 01            TRY AGAIN         </div>	The difference of the black level is not changed by the corrective control data when the gain difference of the black level is in the range 0 dB to 18 dB.	1. check circuit between D and E on Fig-1 (page-1)

<div> BLK: NG  : CIRCUIT NG?  DET n  TRY AGAIN </div>	<p>.n=08 → R-ch pedestal system</p> <p>.n=09 → B-ch pedestal system</p> <p>Effect: The polarity of the error voltage of R-G or B-G is not inverted even though the control voltage is changed when the error voltage is within + 1 bit.</p>	<p>1. check circuit between D and E on Fig-1 (page-1)</p>
<div> BLK: NG  : CIRCUIT NG?  CTL n  TRY AGAIN </div>	<p>.n=02 → R-ch } Out-of-range  .n=03 → B-ch } of AUTO  .n=06 → G-ch } BLACK SET  (Malfunction in the control system)</p> <p>.n=08 → R-ch } Out-of-range  .n=09 → B-ch } of AUTO  BLACK BALANCE  (Malfunction in the control system)</p> <p>Note: After completing this check, remove the jumper wire connecting TP8/AT-31 board to E1/AT-31 board.</p>	<p>1. check circuit between A and C on Fig-1 (page-1)</p>



#### 4. Check Auto Circuit



**BLOCK DIAGRAM**      **BLOCK DIAGRAM**

**AT-13 BOARD**